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# Railway Age Gazette

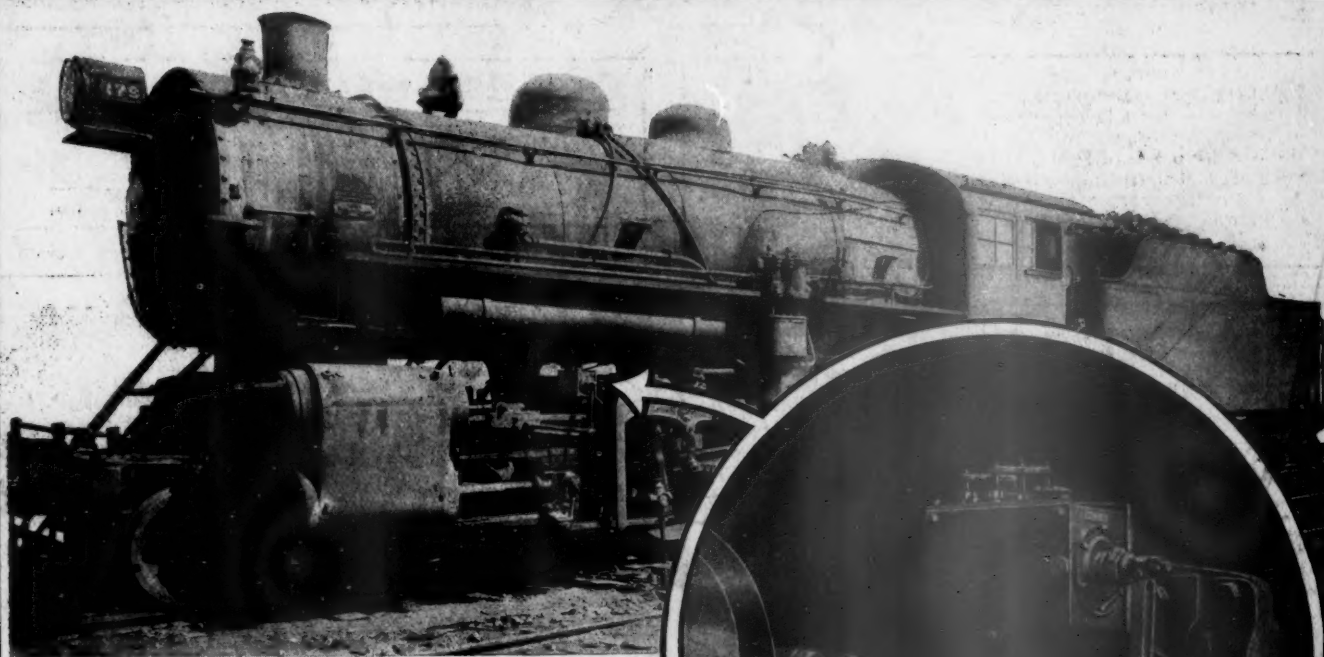
SECOND HALF OF 1917—No. 18

SIXTY-SECOND YEAR

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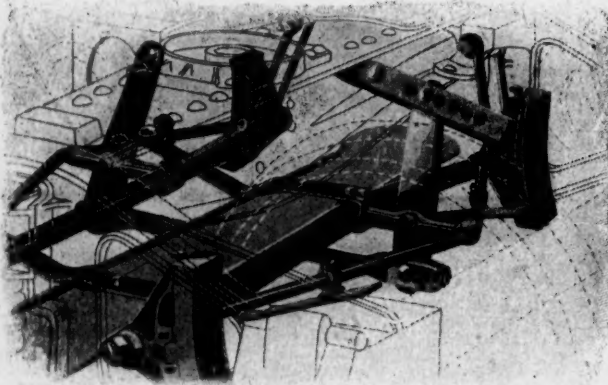
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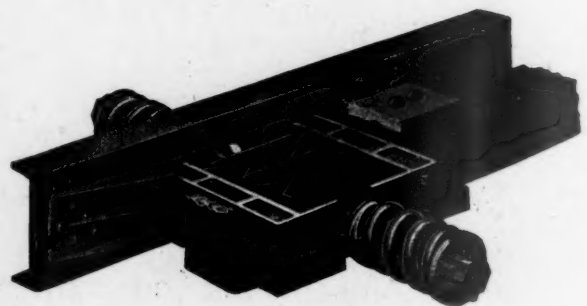
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# Railway Age Gazette

Volume 63

November 2, 1917

No. 18

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### GENERAL NEWS SECTION.....

\* Illustrated.

The attitude—affable or the opposite—in which a ticket seller or a conductor deals with a passenger may have an important effect in making friends—or enemies—for the road. This has been the substance of innumerable admonitions, by circular and otherwise, to trainmen and station men. The same principle applies also in the case of men “higher up.” The Springfield (Mass.) Republican of recent date says:

“The Edison Company has been attacked at a hearing in Boston before the gas and electric commission on the charge that that company maintained an expensive lobby at the state house and the city hall. Whatever the facts in the Edison case, it can hardly be denied that railroad and other public service corporations employ a large amount of legal talent in getting their claims presented to public bodies. When certain citizens appeared recently before the Massachusetts Public Service Commission to ask for the restoration of certain train service on the Boston & Maine, the railroad's case was presented, not by a representative of the operating or the traffic department, but by a lawyer. Yet a simple and businesslike explanation of conditions from a railroad officer would probably have left a better impression on the petitioners than a lawyer's explanation of a matter in which no point of law was involved.”

The impressions made on people's minds constitute the whole text of the Republican's little editorial. Not a very large matter, surely; but is not the suggestion just as significant as that relating to the ticket seller? Not that the lawyer was not affable; very likely he was excessively so; but the mere fact that a man is a lawyer, whose meat and drink is polemics, may often be sufficient to produce the unfavorable impression to which our contemporary alludes. The lesson of this little incident is for the superintendent and the general passenger agent: make yourself so fully and thoroughly competent to represent your department before commissions and other public authorities or assemblies that the general manager will never think of calling in the legal department to speak for you. Or, to put it another way, consort so constantly with the gentlemen of the legal department that you can appropriate for yourself all their finest arts! It is no answer to this to say that superintendents are men of action, while lawyers are men of words; there is no law forbidding the superintendent to be skillful both in actions and in words.

Because of a typographical error the *Railway Age Gazette* said in its editorial, entitled “Now Comes the Real Tug of War,” which was published in last week's issue, that in July the railways handled “almost 10 per cent more ton-miles with each freight locomotive than they did in July, 1916.” The statement should have been that they handled almost 19 per cent more ton-miles with each locomotive. This figure calls attention to the increases which have occurred recently in locomotive efficiency. The number of ton-miles handled with each freight locomotive in 1916 was over 26 per cent greater than in 1915; but the performance of 1916 has been far surpassed by that of 1917. The Railroads' War Board was organized in the early part of last April. In that month the ton mileage per locomotive was 13.3 per cent greater than in April, 1916. In May the increase in ton mileage per locomotive over the same month of the preceding year was 15½ per cent; in June, 21 per cent, and, as already indicated, in July, 19 per cent. These increases in ton mileage per locomotive have been partly due to increases in the number of tons handled per train and partly to increases in the number of miles made per locomotive per day. The increases in the trainload over that for the corresponding months of last year have ranged from 6½ to 11½ per cent. The increases in the average number of miles made per locomotive per day have not been relatively so large, but they have been of much importance. In the months of April, May, June and July, 1916, the average miles made per locomotive per day never exceeded 66 miles. In the same months of 1917 the average mileage per locomotive per day never was less than 68.8 miles, and in June it was 70.7 miles, and in May, 71.3 miles. The shipping public deserves much of the credit for the increases in the average loading per car, and of course these have contributed to the increases in the average trainload, but the railways deserve all of the credit for the greater efficiency represented by the increases in the average number of miles run by each locomotive daily.

## RIDER ON COMMERCE ACT AMENDMENT PRODUCES RATE TANGLE

THE war has led to such a general application of the principle of governmental price-fixing that the popular assumption is that it is something new. As a matter of fact, the railroads have been subject to price-fixing by federal and state governments for the past ten years. During that time the rate scales and adjustments of years upon which the commercial prosperity of the country was founded have been attacked and dissected to such an extent that hardly a trace remains of the railroad rates which were in effect in 1907. With a few exceptions, such as the "five per cent" rate case, the trend of rates has been downward in the past decade. The difficulties of the railroads have been intensified by the conflicting activities of the federal and state regulatory bodies. The same testimony and the same expenses incurred by a hearing before one commission must be duplicated before another. Frequently, the decisions of different commissions are far apart with resultant inconsistencies in rates. In this regard, the "five per cent" case is typical. In 1914 the Interstate Commerce Commission granted advances in rates after an investigation extending over a period of several months. The Public Service Commission of Indiana has not yet permitted the rates to become effective on intrastate business.

The acme of repressive regulation was reached recently when a rider was attached to the bill increasing the size of the Interstate Commerce Commission, which prohibits any advance in freight rates until the reasonableness of such an advance has been first passed on by the commission. The result of this amendment has been to prevent the completion of certain readjustments of rates which actually had been begun, with the result of throwing many tariffs into a snarl that has caused some glaring examples of unfair discrimination between communities and shippers. The rate tangle which has been created will add months of work to the already crowded docket of the overburdened commission.

Illustrative of the complications resulting from the new amendment are the iron and steel rates between Youngstown, Ohio, and Chicago, and between Pittsburgh, Pa., and Chicago. There are at present two sets of rates in effect from Youngstown to Chicago, one of which is higher than the rates from Pittsburgh. This is due to the fact that certain railroads carry special tariffs on iron and steel from Pittsburgh and Youngstown, while other carriers publish class rates covering those articles. On September 20 all class rates were advanced in Official Classification territory and the roads issuing commodity tariffs covering iron and steel from Pittsburgh and Youngstown have been unable to raise these rates to conform with the class rate advance because of the present necessity of securing the approval of the Interstate Commerce Commission. Application for such permission was filed with the commission prior to September 20, but, up to the time of writing, it has not yet been acted upon, with the result that iron rates from the iron producing districts in central Ohio and western Pennsylvania are in a very chaotic condition.

There are many other examples of rate inconsistencies resulting from the legislation referred to. Petroleum rates from St. Louis and Peoria to Detroit, Cleveland and Pittsburgh have been advanced while Chicago rates to the same cities have remained unchanged. Rates on lumber from Chicago to Detroit, Cleveland and Pittsburgh have been advanced, but St. Louis rates to the same points have not changed. Under the law as it stood before it was amended, these inconsistencies would not have developed, since, unless the commission formally interfered, the railways could have gone ahead and finished the readjustments of rates on which they had begun.

The passage of the provision in question is an example

of the sort of ill-considered, half-baked regulation to which the railways have been subjected ever since the era of regulation was entered. The representatives of other classes of industrial concerns have stood by without interfering apparently on the theory that it was "not their funeral." Now, however, that other classes of industries are being subjected to regulation, men in other lines of business may become able to appreciate better what slap-dash regulation means and be more disposed to co-operate with the railways in trying to put a stop to it.

## DISCIPLINE IN ITS MORE DIFFICULT ASPECTS

A RHODE ISLAND correspondent, in another column, discusses the three disasters to passengers recently prominent in the news. The main issue is simple, without regard to the details of the antecedents; all railroads, however high the quality of their forces, as a whole, must be alert to detect men who lack the health or the moral self-discipline to keep awake in the cab; and all must expect always to have a percentage of men who never had and never will have the courage to tell the whole truth about a collision, if their own vital interest seems to be at stake. (In fact it takes unusual grit to tell unpleasant facts in many situations where the issues are far less important than the loss of one's job or reputation.)

With these two most familiar faults—falling asleep on duty and telling lies, in extreme circumstances—we may consider also the reckless habit of neglecting regular sleep (going to a ball game or joining one's wife on a shopping excursion, when the rest period happens at a time favorable to those diversions) and the combination of poor judgment and a too-high estimate of the value of money which results in going on duty too soon after a serious sickness. All these faults are alike in that they cannot be dealt with directly. Firemen cannot be depended on to report a sleepy engineer. No inspector can follow men when they are off duty. Equivocators cannot be cured of their vice except as their moral natures are educated. We are here dealing with the most elusive of the human weaknesses which the trainmaster encounters in the performance of his educational functions; imperfections which no printed rules will touch. The problem is to do whatever is possible to get men into that frame of mind where they will not desire to do the wrong thing; or more accurately, where they will, with definite and intelligent purpose, desire to do the right thing.

If we review what we have learned in the past concerning the solution of this problem we shall find it pretty well summed up under two heads: (a) Keep up the training of all employees, even the experienced, so that none shall get rusty on the rules, and (b) see that, always, between the officer and the employees there is a *good understanding*. The first indicates *what* is aimed at and the second indicates *how*; or, rather, the *how* as it relates to the finishing touches. The first may seem to be so obvious and elementary as not to need mention; but is it not often true that unfamiliarity (not ignorance) as regards a simple rule is the first weakness found in an employee who has failed at some point? The second point, a good understanding, is the first and the most important practical element in esprit de corps (which we talk about in theory) actually carried out in a tangible way. Until the officer and the employee understand each other well enough to have some degree of actual sympathy, there can be but faint assurance that the employee has acquired a usable knowledge of the rules, much less an intelligent determination to carry them out. Incidentally, a good understanding is the only eradicator of the strike microbe.

And what we have learned in the past comes pretty near to being all that there is to be learned now. We have learned the lesson but we have not learned it well enough. This article is not designed to bring out any new lessons, but to



call attention to old ones. If we were to go into details we might make the same mistake that is so often made in actual life in the railroad office; keep the attention too closely riveted on the elementary branches of the subject. The most direct injunction that the superintendent or trainmaster can take to himself in this matter is to put a hundred per cent more energy into the same kind of work that he is already doing. In that way he may carry himself and his pupils above the primary class, and broaden both the pupils and himself.

There is, however, one new suggestion; it is found in the brief address of C. H. Baltzell, a superintendent of the St. Louis-San Francisco, before the National Safety Council in New York City last month (*Railway Age Gazette*, September 21, page 521). Speaking of the safety-first propaganda as applied to men in train, yard and switching service, he said that it was a good thing to encourage athletics among these men, as a recreation; for the reason that the man who practices athletics is much more alert to take care of himself and avoid bodily injury in his everyday work. Why not adapt this advice to mental as well as physical work and recreation? Men who exercise their minds when off duty, in recreation or otherwise, will exercise them with better skill and effect when on duty.

### RAILWAY MAIL PAY

**I**N a formal statement filed with the Interstate Commerce Commission early in March the Postmaster General stated that under the space basis of compensating the railways for carrying the mails, put in effect on November 1, 1916, and the tentative rates put in effect at the same time, the total compensation of the railways was \$3,225,405 a year greater than it would have been under the weight basis and rates previously applied. Similar information was imparted to the public in a press statement given out by the Post Office Department about the same time. Since then, however, something has happened to the \$3,000,000. It does not show up in the latest reports of railway earnings and expenses. Incidentally, the reasons why it does not may serve to explain why mail is sometimes received less promptly than formerly.

The Interstate Commerce Commission gave out the other day its usual monthly statement of railway earnings and expenses for the month of July and seven months of the calendar year. This showed very large increases in the revenues received by the railways for the transportation of freight, passengers, express and "all other transportation"—together with corresponding increases in all items of expense—but the revenues from mail traffic for the month showed a decrease from \$5,052,461 in July, 1916, to \$4,836,825 in July, 1917, or from \$22 to \$21 per mile. For the seven months the mail revenue was \$35,476,220 as compared with \$35,197,712 in 1916. This is an increase of \$278,000 or only from \$153 to \$154 per mile. Freight revenue per mile had increased from \$6,172 to \$6,900; passenger revenue from \$1,675 to \$1,877; express revenue from \$215 to \$259, and revenue from all other transportation from \$259 to \$278. Has all this increased volume of business been carried on without an increase in the amount of mail correspondence? Has the boasted parcel post failed to keep pace with the increases in other kinds of transportation? Perish the thought! For the calendar year 1916 the railways' revenues from mail pay were \$265 per mile as compared with only \$255 in 1915. Up to March of this year they still showed an increase. Something has happened since that time with the result that for seven months of the year the railways had actually received only \$278,000 out of the promised \$3,200,000 increase.

As a matter of fact, it has been promised ever since 1914, when the joint congressional committee, which recommended

the space basis of payment and the rates which went into effect tentatively last November, estimated that they would increase the railways' compensation by about \$3,000,000 a year. The railways have always been suspicious of the estimate, and have protested that the rates were too low, while the Postmaster General has asked the Interstate Commerce Commission to reduce them on the ground that they allow the roads to earn too much money.

What has happened to the \$3,000,000 has been exactly what the roads foresaw. In fact, some of the advocates of the law themselves had felt called upon to explain the joker to their colleagues in defending themselves against charges of too great liberality to the railroads. Formerly the railroads were paid for carrying the mail on the basis of weight, just as the post office department itself receives its pay on the weight basis. Under the space basis, so long advocated by the department, it pays the roads so much per car for each mile the car is hauled and has the privilege of putting as much mail in a car as it can get in. The railroads cannot object to this; it is exactly in accordance with their campaign to induce shippers to load freight cars to capacity. The difficulty is in the question of rates. The rates now applied were based on the former average loading of about 3 tons to a car, while the maximum capacity of a car ranges up to 20 tons. In other words, the post office department proposed, and got Congress to approve tentatively, a plan whereby it pays the railroads per car mile about what it used to pay for a 3-ton car, and then proceeds to take the mail out of two or three cars or trains and load it into one. This was explained by Representative Moon in the debate in the House on February 8, 1916, in the following language:

"But, you may ask me, if it is costing more by three or four million dollars, in the first place, to go to the space basis than to remain on the weight basis, why should we make the change? My answer is . . . your department can handle the cars in which they pay for the space and can so adjust the loading and unloading and the transportation as to recoup within a year or two every dollar that is lost by the change in the basis of compensation from weight to space."

The department has apparently arranged matters so that it can recoup even before the first year is up. The new plan had been in effect but a short time when the department issued its statement to the press that it was paying the railways at a higher rate per year than before, and for a time the railway mail revenues showed a slight increase. But this was not for long. A general readjustment of mail service was undertaken. Mail formerly handled in two cars on two trains was "consolidated" into one car on one train. On some trains the space formerly used by mail clerks to sort the mail en route became too valuable to be used for that purpose. The clerks were taken off, the space was filled with mail formerly carried on an earlier train and the sorting was done after arrival at the terminals. This reduced the expenses of the department and the revenues of the railways but it also delayed the mails. People who now receive letters on the second delivery that formerly arrived the first thing in the morning should not jump to hasty conclusions that the delay is caused entirely by the fact that the railways are hauling so many troops and so much government freight.

Undoubtedly, the heavier loading of mail cars possesses some compensating advantages to the railways. It is cheaper to haul one car loaded with 10 tons of mail than two cars holding 5 tons each. Moreover the entire question of mail pay rates is now before the Interstate Commerce Commission for determination, elaborate statistics are being gathered by both the roads and the department to aid it in its decision, and whatever rates the commission finds just and reasonable will be made retroactive.

The point is that the post office department has tried to

make the public think it has increased the railway mail pay when in fact it has reduced it, for no one believes that the volume of mail carried is not greater than it was last year.

Possibly the statement that the roads were being paid more was intended to soothe the considerable element that believes that railway mail rates have always been too low, while the effort to reduce the rates is for the benefit of the class, which probably includes more voters, that believes otherwise or that does not care whether the railroads are treated fairly.

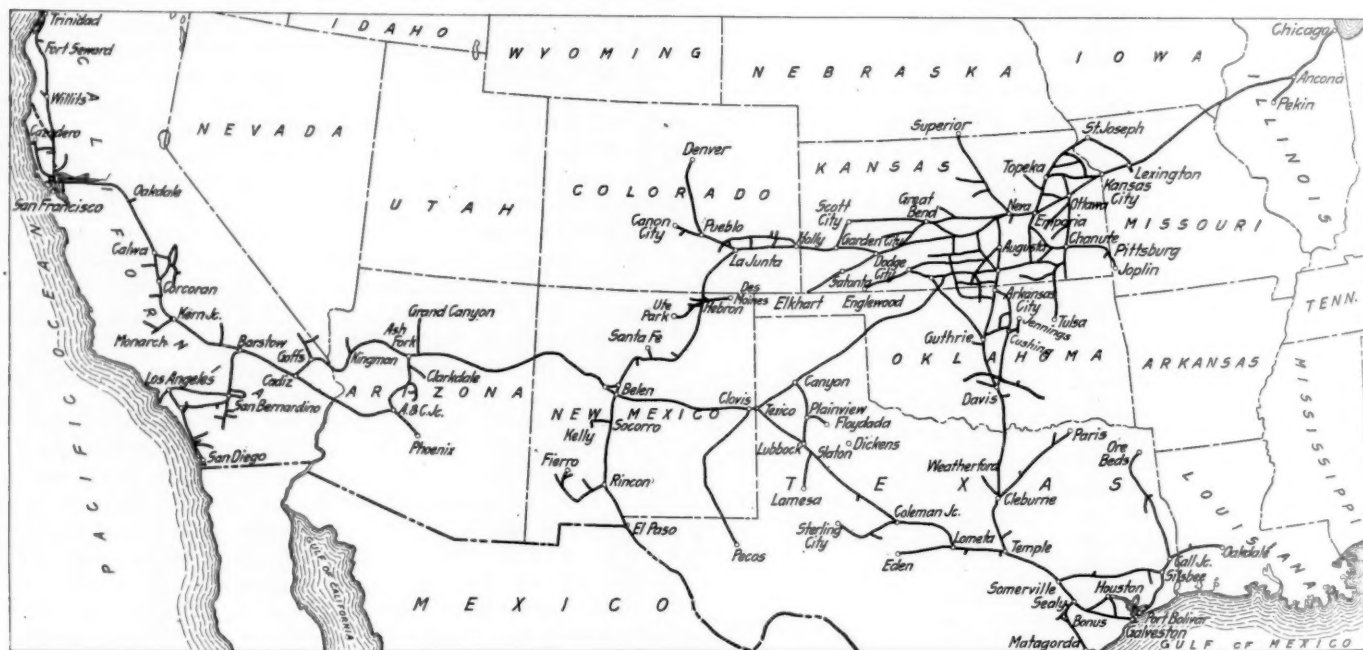
### ATCHISON, TOPEKA & SANTA FE

THE amount required to pay interest on all of the outstanding bonds of the Atchison, Topeka & Santa Fe was less in the fiscal year ended June 30, 1917, by approximately half a million dollars than the amount required to pay the interest on the bonds outstanding 10 years before. In 1908 the interest requirements were \$12,579,000; in 1917, \$12,113,000. Since 1908 the Atchison has invested \$169,407,000 in additions, betterments and extensions, this being on top of an investment in railroad property of \$577,433,000 made prior to June 30, 1908. As an example of conservative financing, this is almost unique in American

The causes and conditions which have permitted increased investment to be followed by more than a proportionate increase in net available for profit on investment, and the manner in which new capital was raised for investment, although related both in their results and in their causes, should be studied separately.

The fiscal year ended June 30, 1917, was a record year both in gross and net earnings for the Atchison, Topeka & Santa Fe. Gross totaled \$159,627,000, comparing with \$137,070,000 earned in 1916, which year itself was far and away better than any previous year. Net available for interest and dividends was \$51,789,000, comparing with \$45,312,000 in 1916, which year again was better, as far as net was concerned, than any previous year in the company's history. In other words, up to June 30, 1917, the Atchison had not ceased to enjoy the full effects of the law of increasing returns on railroad investment which the majority of American railroads felt up to 1907 and which up to that time was generally considered as characteristic of well managed roads in this growing country.

In 1917 freight revenue amounted to \$111,809,000, an increase of \$20,377,000. Passenger revenue amounted to \$32,770,000, an increase of \$1,201,000. The Atchison in 1917 operated 11,270 miles of road, so that the average gross



The Atchison, Topeka & Santa Fe

railroad history. But even more remarkable is the fact that whereas so many roads have felt the law of decreasing returns during these 10 years and that the average return on all railroad investment during this time has been on the downward trend, the net on the Santa Fe has shown an increasing ratio of percentage earned on investment. Notwithstanding the enormous increase in investment, the great increase in rate of wages and cost of materials, and in fact of all costs of doing business, the Atchison earned net available for interest and dividends totaling \$51,789,000 in 1917, or at the rate of 6.93 per cent interest on its total property investment. Each of these two facts—the conservatism of its financing and its increase in earning power more than commensurate with the increase in investment—has a most important bearing on the value of Atchison stock as an investment; but in studying the economic aspects of the development of the property in their relation to the economics of railroad operation and development in general in this country, the two must be kept entirely separate and distinct.

revenue per mile of road was \$13,858. With an increase of \$22,417,000 in total revenue over 1916 there was an increase of \$12,603,000 in expenses, the total expenses in 1917 being \$96,334,000. Maintenance of way expenses were slightly less in 1917 than in 1916, due in part to the extraordinarily heavy maintenance expenses of 1916 necessitated by the Galveston flood, and in part by the scarcity of labor which necessarily limited maintenance expenditures. Maintenance of equipment cost \$25,273,000 in 1917, an increase of \$4,758,000 over the previous year. Apparently every effort was made to keep the same standard of maintenance of equipment as that adhered to in previous years and the increase in expenses represents the increased cost of material and of labor.

Transportation expenses amounted to \$45,911,000, an increase of \$7,629,000. Notwithstanding the fact that the second half of 1917 reflects the increased wages necessitated by the so-called eight-hour law and the great increase in fuel prices—both coal and oil—which have taken place, the



ratio of transportation expenses (the out of pocket cost of doing the business) to gross operating revenues has increased only slightly—from over 28 per cent to approximately 29 per cent. A ratio of transportation expenses to gross revenues of less than 30 per cent in these times of high labor costs and high material prices is truly remarkable. Adequate facilities, an adequate organization and a very efficient use of facilities are in general the explanation of this striking showing. The Atchison serves a country which has grown in population and in prosperity very rapidly. The railroad has expanded both extensively and intensively at a rate which has continuously kept facilities well ahead of the requirements placed upon them.

The policy pursued by the Atchison management and that pursued by the Pennsylvania Railroad are founded on the same principle. Both managements have attempted to develop their property with an eye to many years in the future. Pennsylvania was met with obstacles in the way of procuring additional terminal facilities, etc., that made its problem quite different from that of the Atchison. The phenomenal success of the Atchison must be attributed in great part to the accuracy with which President Ripley and his directors forecast the trend of the development of the country and the skill, foresight and effectiveness with which the railroad property was developed to conform with these forecasts. When compared with the mistakes that have been made in extensions and developments of some of the other southwestern roads the precision with which the Atchison built or bought new lines, added to its facilities here, built double track there, etc., seems almost uncanny.

The conservative and sound policy of financing which was pursued would have been impossible without the success of the management in developing new business and handling it at a cost which showed steadily increasing profits. On the other hand, it would have been easy to have pursued a different financial policy, and a full realization should be had of how important it is that the Atchison financed its constantly and rapidly growing needs through the sale of stock or convertible bonds, which in large part have been converted into stock, and through the expenditure of surplus belonging to the stockholders. In 1908 there was \$217,130,000 stock outstanding and \$315,454,000 funded debt outstanding. At the end of 1917 there was \$343,822,000 stock and \$288,809,000 bonds outstanding.

The Atchison is today, in credit and in cash resources, in a most enviable position. There are no loans and bills payable. Cash on hand amounted on June 30, 1917, to \$37,788,000, and time deposits to \$1,260,000. Materials and supplies, which are inventoried not at their present value but at their original cost, which was much lower than the present value, totaled \$18,981,000.

Is there a sign of a turn in the tide of affairs of the Atchison, Topeka & Santa Fe in its annual report for 1917? That is a question of vital importance and yet one which is quite impossible of authoritative answer. In 1908, with which year certain comparisons in these remarks have already been made, there was a quite startling drop in net available for interest and dividends, and 1907, the year previous, had been a year of great prosperity. Could anyone in 1907 have predicted the 1908 results? Could anyone in 1908 have predicted the results of the next ten years? The answer to the first question is comparatively easy. There were many people as far back as 1906 who foresaw the trend of general conditions and the management of the Atchison itself in 1907 was preparing quite effectively for the great depression which took place in business during that and the following year.

The answer to the second question cannot be definite, but the fact is that the Atchison went on with its program of improvements. There is no evidence now, in going back over the annual reports of the company, that President

Ripley lost faith in the future of his company or faltered in his program of keeping facilities ahead of the requirements thereof. On the other hand, it is almost impossible to calmly study present railroad conditions and not feel that even the Atchison cannot go on long showing increasing margin of safety to investors or even a continued margin of safety unless there is a change in general conditions. It may well be that 1917 is not the culmination of the history of the road. It may be that it is a high peak which will be succeeded by depressions and other high peaks, but it is difficult to see how certain general and fundamental conditions which are affecting other railroads can be for an indefinite length of time fended off by the Atchison, Topeka & Santa Fe.

Take the question of taxes alone. President Ripley estimates that it is probable that they will be \$12,000,000 for the calendar year 1917. In the fiscal year ended June 30, 1917, taxes amounted to \$9,871,000. In the previous fiscal year they amounted to \$6,210,000. In recent years they have averaged less than \$6,000,000. Here is an increase of 100 per cent. The increases in wage costs vary, and are not, of course, anywhere near 100 per cent, but on the other hand they are great enough so that it is almost inconceivable that a large enough gain in business can be handled with a small enough increase in number of employees to offset this higher cost, nor is it easily conceivable that heavier train loading, better car loading, greater number of miles per car per day and more effective use of facilities can at the present rate of increased costs offset the higher prices for materials. It is said of the late E. H. Harriman that he could see the downward trend of events, and of railroad prosperity in particular, after 1906 as clearly as anyone, but that he remained an optimist because of his entire confidence in his own ability to meet any conditions which might arise. It may be that Mr. Ripley and the Atchison are such strong swimmers that a tide which may bring disaster to the majority of railroads can be successfully breasted, but such a belief, notwithstanding the truly wonderful showing of the Atchison in 1917, must be founded on faith rather than on substantial evidence.

The following table shows the principal figures for operation in the fiscal year 1917 compared with 1916:

	1917	1916
Average mileage operated.....	11,270	11,247
Freight revenue .....	\$111,809,085	\$91,432,429
Passenger revenue .....	32,770,089	31,568,601
Total operating revenues.....	156,179,121	133,762,392
Maintenance of way and structures.....	19,119,336	19,518,635
Maintenance of equipment.....	25,273,169	20,514,960
Traffic expenses .....	2,780,823	2,755,736
Transportation expenses .....	45,910,505	38,281,054
General expenses .....	3,494,122	2,904,040
Total operating expenses.....	96,333,569	83,730,960
Taxes .....	9,870,634	6,210,366
Operating income .....	49,951,675	43,779,993
Gross income .....	53,399,966	47,087,123
Net income .....	39,209,073	32,579,735
Dividends .....	19,250,325	18,690,965
Appropriated for additions and betterments....	19,875,211	7,000,000

## NEW BOOKS

*Railway Connections and Junction Points.* By R. H. Gray. 341 pages, 4 in. x 6 3/4 in. Bound in paper. Published by H. K. Cammann, 24 Market Place, Baltimore, Md. Price \$1.50.

This little handbook shows, in compact form, the passenger and freight connections of about 150 of the principal railroads of the country, symbols being used to aid the reader in quickly distinguishing between freight and passenger connections; between places where there is a track connection and those where there is none, and to show other data. The book is printed in rather small type, but even at that the New York Central's connections fill more than seven pages. The Central connects with the Lehigh Valley, for example, at 22 places; with the Wabash at 18, and the Pere Marquette at 11, etc. The Seaboard Air Line connects with the Atlantic Coast Line at 63 places. The Southern, the Southern Pacific and other large roads show equally ponderous lists.

The Chicago & North Western and the Chicago, Milwaukee & St. Paul probably take the medal; the stations of these roads are in neighborly (or unneighborly) juxtaposition at no less than 123 places. These are all shown, in alphabetical arrangement, under each of the two roads.

*Locomotive Handbook.* Compiled by the American Locomotive Company. Bound in leather, 195 pages, 3½ in. by 6 in. Published by the American Locomotive Company, 30 Church street, New York. Price 75 cents.

The locomotive designer has always felt the need of a compact and concise source of information on the fundamentals of locomotive design for ready reference. The American Locomotive Company has done much to supply this need in this *Locomotive Handbook* which has just been published. Heretofore the locomotive designer has been compelled to refer to material published in various places to get the information he desired on locomotive design, or else possibly to refer to rather cumbersome notes compiled by himself. The *Locomotive Handbook* will, therefore, fill a real need.

The book opens with a brief description of the American Locomotive Company. This corporation has a full working capacity of 3,000 locomotives per year and employs 20,000 men. This is followed by formulas and tables giving the tractive effort of both simple and compound locomotives. The next subject considered is Train Resistance, the material being contributed by F. J. Cole, chief consulting engineer of the American Locomotive Company. It includes data on the resistance of freight and passenger cars of different weights and at different speeds, together with information showing how the results of tests check with the values given in the handbook. A comparison of the resistance of four and six wheel trucks is made and interesting information is included regarding the effect of a stop in increasing resistance. All phases of the subject are considered, such as velocity grades, acceleration, weather conditions, track resistance, etc.

About eighteen pages are devoted to the subject of locomotive ratios; this was also written by Mr. Cole and is based substantially on bulletin 1017 issued in January, 1914, by the American Locomotive Company. Illustrative examples are given to show how the information given under this head is to be used. Both saturated and superheated steam locomotives are considered. Following this is a section of about eight pages which gives the efficiency of longitudinal seams, stresses in staybolts and crown stays, method of bracing the back head and front tube sheet, the shearing stresses on rivets, etc.

Valuable information is also given on counterbalancing and fuel oil, the counterbalancing information being taken from the 1915 proceedings of the American Railway Master Mechanics' Association. Ten pages are devoted to the federal rules on locomotive inspection and testing.

The balance of the handbook contains methods used by the American Locomotive Company in the design of axles, crank pins, frames, piston rods, helical springs, elliptical springs, location of gage cocks for various grades over which the locomotive operates, piston thrust, etc. Information in tabular form is also given regarding the proper pressures for mounting wheels and piston rods. Several tables are included showing the effective area of staybolts, the proper location of tires on driving wheels, standard U. S. screw threads, properties of saturated and superheated steam pipe threads, wire and sheet metal gages, moduli of rectangular and circular sections, decimal equivalents, speed-second table, tangent deflections, metric unit and U. S. equivalent tables, etc. Information is also given regarding valve setting, including instructions for setting the Walschaert valve gear.

Much time and a great deal of time have been exerted in the compilation of the information published in this book and it will be of considerable assistance to railroad men interested in locomotive design.

## Letters to the Editor

### THE WEARY AND THE UNTRUTHFUL

PROVIDENCE, R. I.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The North Branford (Conn.) collision of trolley cars has a lesson for us, has it not?

The report of the Connecticut Utilities Commission on this collision, which has recently been issued,\* discloses a good deal of loose practice; irregular working hours, weak or worthless supervision, and absence of necessary rules. The natural comment of the steam-railroad man will be that this collision has no lessons for him; but is this so certain? The steam roads do, indeed, have the 16-hour law to restrain them, and the stern logic of costly collisions in the past has taught them the need of constant and vigilant supervision of all train operations; but the spirit of the 16-hour law is often violated by them now, the same as in former years; and many superintendents, probably the great majority, have to confess (to themselves) that the actual supervision of the personnel on their division is far below their ideals.

The steam-road officer who allows men habitually to work as close to the 16-hour limit as is practicable may not be very different, judged by final results, from the trolley-road officer who works men up to a limit fixed by himself; for, from the standpoint of the supervising officer, 16 hours is a very long day. (This is not saying that it is always dangerous for men to be on duty for that length of time. For the individual, in a particular instance, it may or it may not be excessively long. In countless thousands of cases, trainmen in good health and with the proper spirit, working under favorable conditions, have remained on duty, running trains at moderate speeds, for 16 hours, with no bad results.) And, disregarding, for the moment, all rules and technicalities, we have in this North Branford case two conditions which must be dealt with everywhere: (a) men who go on duty when tired in body, or absorbed, mentally, in something outside their work; and (b) men whose explanations of their dereliction, after the event, are of such character that everybody doubts or denies their truth. In the cold but convincing phrase of the old-time superintendent, saddened as he is by experience, men of all kinds will try to lie out of a bad scrape. Or, in more refined language, many men in all classes are found to lack the courage to tell the truth about their own delinquencies.

Very bad collisions have not been so frequent of late; and, if constant agitation of railroad dangers is the only way of keeping railroad superintendents and trainmen fully alert, it may be that we are not now as alert as we should be; but I need not remind your readers that the lessons are still needed. Even while we read of this trolley collision we have the report of a rear collision at Earlville, Illinois, September 16, where the engineman was asleep. Seven passengers were killed. Does not this require the application in steam road service of the most searching lesson of the North Branford case? Again, Kellyville, Oklahoma, with 25 killed (September 28), would seem to illustrate deficient discipline and education as poignantly as the sleeping trolley conductor at North Branford.

WHATCHER.

FAST TRAIN RUN IN IRELAND.—On the conclusion of the visit to Cork of the Irish Convention a special train was run from that city to Dublin, which covered the 170 miles in 174 minutes, including a stop of ten minutes at Mallow.

\*See *Railway Age Gazette*, October 12, page 656.



# A Study of the Car Interchange Situation

Empty Mileage and Proper Maintenance Important Factors in Distribution Plan. Standard Designs Necessary

By Samuel G. Thomson\*

THE various codes for car service and interchange rules which appeared in the issue of the *Railway Age Gazette* of August 17, page 279, and which were part of a contest for the best suggestions for a new code, are valuable contributions to this subject and contain much material for further thought. This subject involves the most important transportation problems before the railroads today, and should be kept alive by the active discussion of just such men as have contributed to this contest, in order that all may have the benefit of the other fellow's view. Every railroad in the country should have men in their organizations who are studying the broader use of our railroad car equipment, in addition to their own local transportation problems and the interchange of cars with their immediate neighbors.

Without attempting to review the various details of the above mentioned codes, let us consider whether they embody the correct principles, for it is along this line that present discussion should be encouraged; since the formulation of details will be of no avail until the principles are first clearly established and mutually agreed upon.

## HOW MANY CARS SHOULD A RAILROAD OWN?

Each railroad should find it profitable to own, with a reasonable margin of safety, sufficient cars of each kind to take care of the normal business which originates and is distributed on its lines, and also to contribute its fair share of cars to its usual joint business over through or distant routes. With this number of cars, each railroad could do its share in the transportation service of the country and would take care of the normal demands throughout the year during periods of normal business activity. But we must provide for the periods of unusual stress and extra seasonable rushes of traffic. To meet this, we may ask whether efficiency and economy would not best be served by combining the service of like kinds of equipment of several roads some of which might otherwise be idle, rather than require each railroad to own sufficient cars to meet their extra service. The answer would seem to be in the affirmative, which means that railroads should own sufficient cars for average rather than for excess needs. This refers to a class of cars for certain uses or to the railroad's total car equipment.

**Car Quota Plan.**—The quota is used as a basis for car distribution by all of the codes referred to above except the joint-ownership plan of Mr. Smith. The following question then suggests itself: Is the need for transportation on a given railroad equal at all times to the supply afforded by the cars a railroad should own? The car quota advocates infer by their arguments an affirmative answer to this question, since they make it easy for the railroads to maintain their quota of cars and make it hard for them to do anything else, thus assuming that the quota corresponds to transportation needs at all times. The conclusion of the previous paragraph answers: "No," to this question—i.e. that the needs for transportation are not constant, and that the railroad's quota is a supply of home and foreign cars suitable to meet the general average of their needs, rather than their variable needs.

Will actual conditions shed any light on this subject?

Some railroads own many more cars than their share, while others fall far short. However, let us consider the average railroad where the number of cars owned, or its quota, closely approximates the average number of cars to be found on its lines during the year or over a period of years. Will we not find on this railroad that the quota is not so directly related to the number of cars which it actually has on its lines during the various seasons of the year? This relation of quota to needs is also complicated by the nature of the road—whether it is a terminal or a distributing railroad, a through trunk line or an originating feeder line. Does it not seem, then, that our car distribution system should encourage flexible variation to meet the seasonable requirements rather than lay down certain regulations which will have a tendency at least to maintain artificially at all times a given number of cars? We also find that during the longer periods when cars are in great demand the quota supply does not meet the needs, and that under normal conditions and during slack times the railroad manager is not so much interested in having the use of his quota or even his own cars, particularly if another road could use some of his allotment to better advantage and if the adjustment would produce unnecessary empty mileage. If, then, the average need for transportation over a year or a number of years, being approximately constant, does not meet the varying seasonable demands or even periodic changes, it would seem that the quota should not be the basis for a code of car-service rules, particularly with railroads which have a large portion of their cars going off their lines.

The quota basis for car distribution assumes that car ownership be disregarded. The intent of this plan might be to include as much recognition of ownership as possible in making adjustments, but in practice the result would mean a wide dissipation of cars from their owners, and the return of owner's cars would become almost negligible, since adjustments are intended to be made with any cars which may be most easily obtained. The automatic tendency to maintain the quota of cars would also cause considerable unnecessary empty mileage which the plan is intended to prevent.

It is, of course, generally recognized that each railroad is entitled to the possession of cars equal to its ownership; but may we not add a proviso and have it read: A railroad is entitled to the use of the number of cars equal to its ownership, if it is not to be equitably compensated for its own cars when used by others. Is not then the quota argument a question of justice rather than a plan for furnishing a proper car supply, and is not the answer: To eliminate the question of rights by arranging for proper compensation—rather than to add complication by trying to adjust the operation and distribution of the cars to meet these rights? Does not this question of quota disappear altogether, if some plan were devised to compensate each railroad manager equitably for that part of his own cars which he must loan to the other fellow, i.e., so that he would profit just as much from them as if he were permitted to use them himself? It is true that, in times of stress, a railroad's quota and perhaps more would be needed in order to take care of the business demands, which is the desire of every executive. But this satisfying of the transportation needs is hardly a matter of the rights of ownership; so that perhaps the quota is not a good measure of the necessities of the situa-

\* Mr. Thomson was formerly superintendent of motive power and rolling equipment of the Philadelphia & Reading. This article is a continuation of his discussion on this subject which appeared in the *Railway Age Gazette* of July 20, page 109.

tion, since the stress might better be relieved by the combined quotas of several railroads through the agency of a central distributing bureau, which will be required in any event and with any system. Such a bureau or central committee probably would meet emergencies by entirely disregarding the quota plan, and in making seasonable adjustments might find itself acting more often in opposition to the quota regulations than with them.

We see, then, that the quota plan is rather a question of rights of ownership than a basis for car service; also, that it is not a good measure of the variable seasonable needs, that it would have a strong tendency toward the separation of the car and its owner, and would cause some unnecessary empty mileage, all of which features would be objectionable in any new system that may be evolved.

#### EMPTY CAR MILEAGE

Empty car mileage is a tremendously costly factor in railroad operation, and the illusiveness of this problem is ably brought out by J. L. Payne, comptroller of statistics of the Canadian railways, in the August 31 issue of the *Railway Age Gazette* on page 383. In this article he shows how difficult it is to locate any important factor which directly affects the periodic variations in the percentage of empty-car mileage to total mileage. His figures indicate that these variations are not due to changes in the volume of traffic, to the size of the train-load or car-load, to the varying conditions on different railroads, or to long and short hauls. However, regardless of the difficulties, we all agree that this empty-mileage incubus, which, like the poor, we must always have with us, is one of the fundamental operating problems to be improved in the development of our car-service and interchange rules. A thorough study of it may help us to evolve a code which will reduce empty-car mileage to a minimum.

*Effect of Car-Supply on Empty Mileage.*—This phase of the problem was not included in Mr. Payne's analysis; but perhaps a study of the resultant effect of owning an extra amount of equipment above normal demands, and its opposite—the effect of operating with a very close margin or with a shortage of equipment—might reveal a close relation between car-supply and empty-car mileage.

It is evident that the smaller the margin of cars with which a railroad can efficiently meet its traffic conditions, the greater will be the return on the capital invested in equipment; but this is not all of the story. We must also consider whether or not a certain increase in equipment would help the service, and what the net financial result would be in owning a larger number of cars, which in turn might be found to reduce operating expenses by reducing empty-mileage. This phase of the subject must be approached from a country-wide viewpoint, since it is obvious that scattered local increases in car equipment might not perceptibly affect the empty mileage in the respective districts, whereas the result of all railroads operating with an increased quota of cars might be appreciable. We know that a general increase in equipment beyond normal requirements, with properly controlled distribution, would not at least increase empty-car mileage, and usually would result in always having more cars "to move toward home under load." As a general proposition then, except in so far as congestion and limited track facilities affect car distribution, an increase of available cars might be found to be effective in diminishing empty mileage.

We may assume that there is an exact number of cars for each road which would give the best operating and economic results, including in this calculation the car's earning power and the cost of handling it empty, as well as the cost for interest, repairs, and depreciation. If the above inference holds true—that more cars might result in less

empty car mileage—then it would be interesting in this connection to consider or attempt to estimate just where an increase in equipment above normal requirements would reach a point where the total of the interest on the investment of the extra cars, the cost of maintenance, depreciation, etc., would over-balance the savings realized by not having so many empty cars to handle. This might be a good subject for a committee of the American Railway Association, and they might take as their first investigation: The present cost of handling empty-cars, without any reference to the effect of increases.

Some might say that these figures would be estimates only, and that the problem is too involved to be worth the effort. In view, however, of the fundamental importance of the empty-car as a transportation problem, this hardly will be accepted as an answer, and the railroads should take upon themselves the responsibility of determining their present empty-car mileage costs as accurately as possible, even if they do not wish to go further and include the effect of equipment increases on empty mileage. In such a study it would be possible to approximate from the transportation and maintenance accounts, with possibly the addition of some supplementary statistics, a very close estimate of the actual expense involved in the handling of empty cars. These figures would be most interesting if brought down to the point where the railroad manager could accept them as very closely representing actual conditions. It may be desirable to postpone the investigation of the effect of increases in equipment until our car-service and interchange system becomes more settled, since the requirements for each railroad and the resultant effect of their co-operation is dependent upon whether we have a system of interchange with railroad ownership as a basis, a general pooling system, an independent corporation ownership or some intermediate compromise.

*Convertible Cars.*—Convertible types of car, and the adaptation of the usual kinds to other than their regular uses are kindred subjects which enter here as important factors in decreasing empty mileage and consequently in making car service more efficient. The desirability for progress along these lines needs no argument, and it only requires to be kept constantly in the minds of railroad managers, in order that they may have harmonious and continuous co-operation between their mechanical and transportation departments so as to develop equipment which will most economically meet service requirements.

*Operating Maxims, Antidotes for Empty-Car Mileage.*—"Move cars toward home under load" is, of course, an ideal maxim to keep before us at all times and under all conditions. This will accomplish wonders in eliminating empty mileage; and it infers that the car has a home. Unfortunately, however, the origin and the distribution of traffic on each railroad and throughout the country only permits of partial application of this rule. However, it always should be a guiding principle. We might add to this rule the following as a corollary: "Move cars away from home under load rather than toward home empty." This should apply when the handling road is not in the same community as, or does not have a direct connection with, the owner of the car; but it would first require that the various railroads have in service a good proportion of cars of the same design and with interchangeable repair parts. This latter requirement is worthy of careful thought.

#### STANDARDIZATION

The distribution of cars regardless of ownership is a most desirable method of operation—if it does not involve over-balancing serious difficulties. It could be accomplished more satisfactorily, and the various shops throughout the country would soon be better able to repair any car which comes along, if the railroads among themselves



were more favorably disposed toward a general standardization of equipment and were making more actual progress toward that end. This is the direction in which we must look for practicable development such as will permit a disregard of ownership without greatly increasing repair costs, and also attain the advantages of reducing empty-car mileage by a more flexible use of cars.

This may sound revolutionary to our old way of thinking. Yes, but these are radically changing times. It is quite possible and entirely practical for a few of the larger railroads to make a start in this direction. The movement only needs leadership. The fundamentals of railroad mechanics and operation are quite similar the country over, and there is not the necessity that many are wont to believe for the existing wide diversity of practices and designs to meet varying conditions. Improvements can be developed, competition encouraged and individuality fostered by the "one-design" plan. It means co-operative use of well-proved practice, the result of which will be less diversity and less frequent changes.

The following is pertinent from the New York Sun: "An airplane man in the financial district was asked why, with all their resources, England, France and Italy together had so far been unable to do more than hold even with Germany in the air, and were waiting for the United States to clinch supremacy. His answer, in view of the Liberty motor, may be interesting. His opinion was that Germany is second only to the United States in learning how to standardize, and this, with remarkable resourcefulness and skill in repairing every machine, no matter how badly smashed, that falls within her lines, had enabled her so far to hold her end up."

How about the freight car that "falls" on our railroad lines? Are the railroads living up to the reputation we have gained in other fields of activity? The pooling of ideas has built up the motor industry, and the war has given the "standardization plan" a wonderful impetus in the construction of the craft that are to travel under and on the seas and through the air. Why not standardized freight cars on land? If our railroad men will accept the thought that in interchange, "common cars" means "common design," this soon would be accomplished, and the government will have no incentive to buy standard cars or to order adherence to uniform plans and specifications.

The M. C. B. Association has accomplished much in developing some generally used standards, and the American Railway Association actually has built a few sample cars, but there must be more of a general movement among the railroads toward the putting into actual operation of several types of standardized cars of the same design with completely interchangeable repair-parts, before we are able to consider as an economical method of operation any of the schemes involving the disregard of railroad ownership and "country-wide repairs" of cars. Government ownership or joint-ownership by an independent corporation would have an excellent feature in bringing about a very rapid adoption of the standardization of cars throughout the country. But the railroads can own the cars themselves and accomplish the same thing—if they will.

#### CAR REPAIRS

The plan for common ownership of cars by an independent corporation, as suggested by Mr. Smith, in the above mentioned article, has one great objection, in that it removes the incentive for proper maintenance which is always present under a system where the one who uses and repairs the car also owns it. It would seem therefore that an independent corporation ownership, and even a general pooling arrangement of any kind which disregards railroad ownership, is a step in the wrong direction as far as proper maintenance is concerned; also that any code

of rules which is formulated to embrace the proper handling, use and distribution of the cars without giving due consideration to the conditions which will result in the best maintenance will fall far short of the mark.

All of the suggested codes, except the one by Mr. Fisher, disregard the ownership of cars, or make it secondary in their plans for distribution. The above argument, then would also seem to be pertinent to them. Any plan for interchange which has a tendency to render the cars "homeless for repairs" will be a step in the wrong direction until the railroads actually accomplish a much higher degree of standardization among themselves than is now the case.

Proper repairs and economical maintenance of cars is a much larger factor in this car service problem than most people seem to appreciate; so that those who plan for an ideal use and distribution of cars by increasing the distance between the proprietor and his property, first of all had better provide in their plan some *economical* method whereby the car they wish to use will always be ready for service when needed and will be safe to handle. It would seem therefore, from a practical standpoint, that we will be almost compelled to fall back on the railroad ownership plan; also, that we should introduce some incentive to keep a sufficient proportion of the car supply in the hands of the owner for proper maintenance, and to find some way of doing it with a minimum empty-car mileage. Our mechanical railroad officers can appreciate what a hopeless confusion would result from the general application of a system which disregarded these principles of ownership and maintenance and which caused a promiscuous distribution of "homeless" cars throughout the country.

In considering any system which involves the pooling and distribution of equipment without regard to ownership, we may become deceived from the present excellent transportation results which are being effected to meet war conditions. To guard against this, we must look a few years ahead to see where we will land under pool-operation with reference to the mechanical, carrying and service efficiency of the cars themselves, appreciating at the same time that the present pooling methods of disregarding ownership in the distribution of cars are only effective with a relatively small proportion of the total railroad equipment. Unless some plan is introduced into our new code which will give the owner a chance to maintain his standards, the hopelessness of the situation is apparent to all mechanical railroad men, and even to the manager or superintendent who is familiar with foreign-car troubles on his line and with the annoyance of having his yards filled with foreign cars waiting for repair material to be shipped across the country.

Some may argue that foreign cars should be fitted up with any kind of material which will make them safe to run, which is often done to meet emergency. Under such method as a general practice, the mechanical superintendent again will appreciate what the hopelessness of the situation would be a few years hence. Another road's standards might not be safe for his cars, and the judgment of the car inspector and outlying repair-gang would be substituted for the calculations of the drawing room. An inspector's free choice of repairs to an arch bar or truck frame would lead to disaster; and the haphazard substitution of door fastenings, for example, would bring on a resultant confusion which, although not necessarily dangerous, would be like mixing cats and dogs of the undomesticated varieties.

The standard construction of each car, whether good or bad, must be maintained by the workmen as the only practicable shop rule to insure safe repairs. The drawing room must authorize all departures and re-designing. We must maintain the car's own standards or use standardized cars. There is no middle ground of safety. Another point against the repairing of foreign cars with any kind of material in

order to keep them moving—even if the repairs were safely made and the design improved—is, that in creating an atmosphere of utter disregard for standards it would greatly increase repair costs. These increased costs would be excessive if the railroads were not able to carry spare parts for repairs which exactly fit the greater majority of cars going through their shops. Each job would soon become a “cut and fit” operation, and the economy of interchangeability would be lost. In fact, at this very time, when we are most enthusiastic about the great things that are being accomplished in transportation by only a limited pooling of cars from all railroads, there are not many who are talking loudly about the reduced freight car maintenance costs; and many of those who have considered this phase of the matter are dismissing the fact that repair costs have tremendously increased, by the well-worn-out answer: “high cost of material and labor.” Exactly so; but as soon as they begin to look a little further, they need not be surprised to find, that the material is costing much more because it is requiring larger quantities of it for cutting up and forging by hand into odd shapes to fit foreign cars, and that the labor is costing more because the “cut and fit” job by hand for foreign cars is requiring many more hours of pay. Miscellaneous foreign car repairs must be made largely on a day-work basis in order to be entirely fair both to the company and to the workmen. This loss in the use of standard parts for repairs, as well as a partial loss in the use of the piece-work system, is a very ominous thought to the well-informed, when they consider the adoption of a scheme for operating “common cars” in a country-wide pool.

Some may say that the present pooling system is showing so much greater earning power and capacity per car that the railroads can afford to pay greater repair bills. Yes; but let us give the new pooling system “a run for its money” for a couple of years, before we say much about the *net* saving per car; and then let us work for a couple more years under the old plan, with a more favorable Public and Shipper and more lenient Government inspection to deal with, before we publicly advertise our preference for the new pooling system in affording increased capacity per car, or in supplying cars in good order and ready for service when needed.

It would be most interesting for the railroads to analyze their present freight car repair costs at some of their shops or on certain divisions in order to determine the cost of repairing foreign cars relative to the cost of repairing their own. These figures would be startling, and the gradual mounting of the expense curve from month to month would be most interesting to watch as we continue to broaden out our present practice into a country-wide pooling system. The effect of any general decrease or increase in the average cost of materials could be accounted for, thus leaving a resultant curve which would give us some indication of the effect of adopting generally throughout the country a system in which the disregard of individual ownership of cars was a large factor. The great rise in actual cost of material and the percentage increases in the rates of wages are, of course, great factors in our present increased repair costs. This is not so serious, since it will have to come down again, at least part of the way; but the other factor in our present increased repair cost—the foreign car—is inherently connected with the operation of the pooling system, and on this account its effect on costs will keep on increasing, as a larger proportion of cars gets further and further away from the care of their owners.

#### CONCLUSIONS

In summing up we find a large number of fundamental principles involved, as well as kindred subjects to be developed, before we can arrive very far in outlining a practical code for car service and interchange. In this article, some criticism has been ventured concerning the several

codes which have been very ably worked out and which contain much good material. Certain principles in opposition to these codes have been defended with the view of trying to arrive at some unanimity of opinion, such as will form the basis for a start.

On the constructive and practical side, it may be interesting to consider the writer's previous suggestions which appeared in the *Railway Age Gazette* of July 20 under the head of “Some Constructive Thoughts on Car Interchange,” the substance of which is as follows: Railroad ownership of cars; proper compensation for ownership regardless of the user of the car; greater progress toward standardization, and minimum empty mileage. These suggestions were made with the thought of first seeking the correct principles to follow, and then evolving gradually from our present system, a workable set of general regulations amply supported by accurate statistics obtained from a thorough study of present conditions. Some practical suggestions were also included in this article looking toward the developing of such statistics as would afford proper information for the regulation of an equitable per diem rate for loaned cars, and such as would compensate the owner wherever the car might be used.

The information we now have at hand makes it seem that the old method of compensation for car hire is the simplest and the best, that is: to settle on a basis of car ownership, rather than on a quota basis or through the agency of an independent owning corporation. Our immediate investigations should develop a proper system for adjusting the per diem rate so that each railroad would be compensated equitably for its investment in the cars which are loaned to other roads. We should study every means for reducing empty-car mileage, including the development of convertible types of cars and the best ways of adapting the usual types to other than their regular uses. Our new statistics should show whether or not the increasing of the car supply has any effect in diminishing empty mileage, and if it has, should show in net figures, whether it is better for the railroad to own an increased number of idle cars and make less empty-car miles, or to operate with less equipment and make increased empty-car miles. In regard to the maintenance of equipment, it seems desirable to keep as large a proportion of cars as possible in the hands of the owner. As for operation, the railroads should take immediate steps to get a reasonable proportion of standardized cars into service as soon as possible, and then arrange to “move cars toward home under load,” or, when the car is far from home, in the opposite direction under load rather than home empty. A central bureau or board of railroad men should have general supervision of car distribution. They could direct the movement of cars to and from their owners when the natural movement was not promoting economic use and proper maintenance of the cars, and they could act in times of stress when unusual shifts of equipment become necessary in order to meet the local demand in various localities.

Our summary may be condensed into three questions which should assist in focusing the various problems towards a satisfactory conclusion, as follows: Shall we reduce empty mileage by disregarding ownership and thus improve the service of the present supply of cars at the expense of increased repair costs, or shall we keep down the repair costs by returning owner's cars and then improve the service by increased investment in cars at the expense of greater capital charges and increased idle cars and empty-car miles, or should the railroads get together of their own accord in rapidly putting into service standardized equipment having interchangeable repair parts so that the benefit of the two former alternatives gradually could be realized—in that the car supply thus could be improved by a flexible-distribution plan of generally serviceable standardized cars, which



would at the same time keep down the cost of repairs and not require much empty return mileage to the owner?

*The Duty of the Railroads.*—The above treatise may suggest to those in everyday touch with these problems some lines of thought for further development, and perhaps bring out better ideas which may differ in substance. Suggestions will be most valuable which are developed in sufficient detail to apply in a practical way to our present codes, and thus put the railroads in the position of having something actually started which will meet the new demands. This development must be the product of railroad experience; and our railroad minds must reveal the most desirable practice rather than wait for Governmental agencies to point out an arbitrary way. It is not a subject to be disposed of in the rush legislation of a closing Congress, or to be determined by law-makers who cannot appreciate or who are in no way familiar with the technicalities of the problem. Expert discussion by our railroad men should precede the enactment of law, rather than remaining dormant to invite the passing of legislation embodying general theories in accordance with popular demand and which may force a further burden upon the railroads. The recent Esch-Pomerene amendment of the act to regulate commerce may yet, as a by-product of the war, prove to be a great hardship, and its enforcement may be unconstitutional in taking cars from one road and turning them over for the use of another, unless a proper system is evolved to compensate the owner equitably for his cars when they are arbitrarily loaned to another.

This general subject should be argued by our railroad men among themselves and through the columns of the railroad journals as a matter of self preservation, so that when the war is over they will not find themselves blindly following the dictates of some left-over war measure, or adapting themselves to the theories of the platitudinarian. No brand new or revolutionary practice will spring up suddenly, unless, perchance, it is forced by governmental agency on account of a lack of preparedness on the part of the railroads themselves in not being ready when the time comes to put into actual practice such principles and methods as will meet the new demands.

A plea is here entered for our railroad managers to begin an active standardization movement, and then with their car service and interchange experts vigorously to continue their study in the development of the broad principles involved, so that they can start right in at the next meetings of the M. C. B. Association and of the American Railway Association to work out a gradual transformation in the details of the present codes for interchange and car service. These codes today embrace the best that our railroad experts have been able to produce. They are the result of years of conscientious study and service, and contain much in detail which must be used as the basis for a code to meet the change which is taking place in the transportation world. Principles can be revised to meet the new demands, but which need not cause the discard of all the working detail which is the resultant of our best experience. Adherence to railroad ownership in our car distribution would save much of our present practice which can be broadly expanded and supplemented so as to meet the most fastidious demands of our new national transportation.

**EXEMPTION FOR BRITISH RAILWAY SHOPMEN.**—The Railway Executive Committee has informed the British National Union of Railwaymen that the director of recruiting has agreed that, until further notice, skilled men from railway shops, notified to the war-office for release, who are not required for mechanical or craftsmen's work in the army, will be returned to the railway companies, and will not be posted for combatant duties in line regiments.

## ELECTRIC SECTION ADDED TO A MECHANICAL INTERLOCKING PLANT

The Delaware, Lackawanna & Western crosses the Pennsylvania at Bailey avenue tower, about three miles east of Buffalo, N. Y. This crossing is spanned by an overhead bridge carrying the main line of the Lehigh Valley and just north of the tower a highway bridge on Bailey avenue crosses over the Pennsylvania tracks. On account of the large amount of interchange freight handled between the Lackawanna and the Pennsylvania at this crossing, it was decided to add a double track wye connection south of the Lackawanna and east of the Pennsylvania tracks. A large part of the freight is hauled by the Pennsylvania over the Lackawanna main tracks from Bailey avenue to East Buffalo, a distance of about 1½ miles. From this point the trains run about 9½ miles over the Black Rock branch of the Lackawanna to a connection with the Grand Trunk. Previous to the installation of this wye, it was necessary for northbound Pennsylvania freights to back into the Lackawanna interchange tracks over a single-track connection. This arrangement not only blocked the crossing, but also congested the traffic on the interchange track.

Before the wye connection was installed, the old mechanical interlocking plant simply protected the grade crossing. This plant was operated by a 40-lever Saxby & Farmer interlocking machine with 18 levers operating signals, 11 levers operating switches, nine levers operating facing point locks, and two spare levers. The signals were of the lower-quadrant mechanical type. The high signals were slotted and pipe-connected, while the dwarf signals were wire-connected.

On account of the size of the new wye connection, it was not advisable to enlarge the old interlocking machine. Nevertheless, from a construction and maintenance viewpoint, it was desirable to utilize as much of the old apparatus as possible. To do this a 40-lever, style S-8, electric section was added to the old 40-lever mechanical machine, 38 of the mechanical and 33 of the electric levers in the new electro-mechanical machine being used for the operation of the 71 switches and signals.

This type of plant, while it is the first one of its kind on the Lackawanna, is giving good service on the Pennsylvania, and is entirely satisfactory for a busy layout. A recent count shows a total of 5,600 lever and 223 train movements per day at this plant. Of the 223 train movements, 43 were passenger and 180 freight.

The tower is of two-story frame construction, steam heated, and equipped with electric lights. In addition to housing the interlocking apparatus, the tower is used as a block station by the Pennsylvania for protecting traffic beyond the interlocking limits.

The electro-mechanical machine is located on the second floor of the tower. The electric levers of the S-8 machine are fastened in an iron frame above the mechanical locking bed. Each of the electric levers is connected to the locking bed by vertical iron rods, which actuate the mechanical locking. An indication lock is provided, preventing a signal being cleared under improper conditions. An electric lever locks each mechanical lever operating a switch or derail. Where a crossover requires two mechanical levers, on account of the distance from the tower, one electric lever locks both. The locking of levers 035L and 036L is so arranged that lever 036L must be operated in advance of 035L. This is done so that it will not be necessary to stop Lackawanna trains on the railroad or trolley crossing and to assist the trains over the grades on either side of the tower. Slow-speed signal 040L is given a separate number in order to permit switching movements to be made when Pennsylvania trains are on the crossing.

Above the machine, and supported from the ceiling by

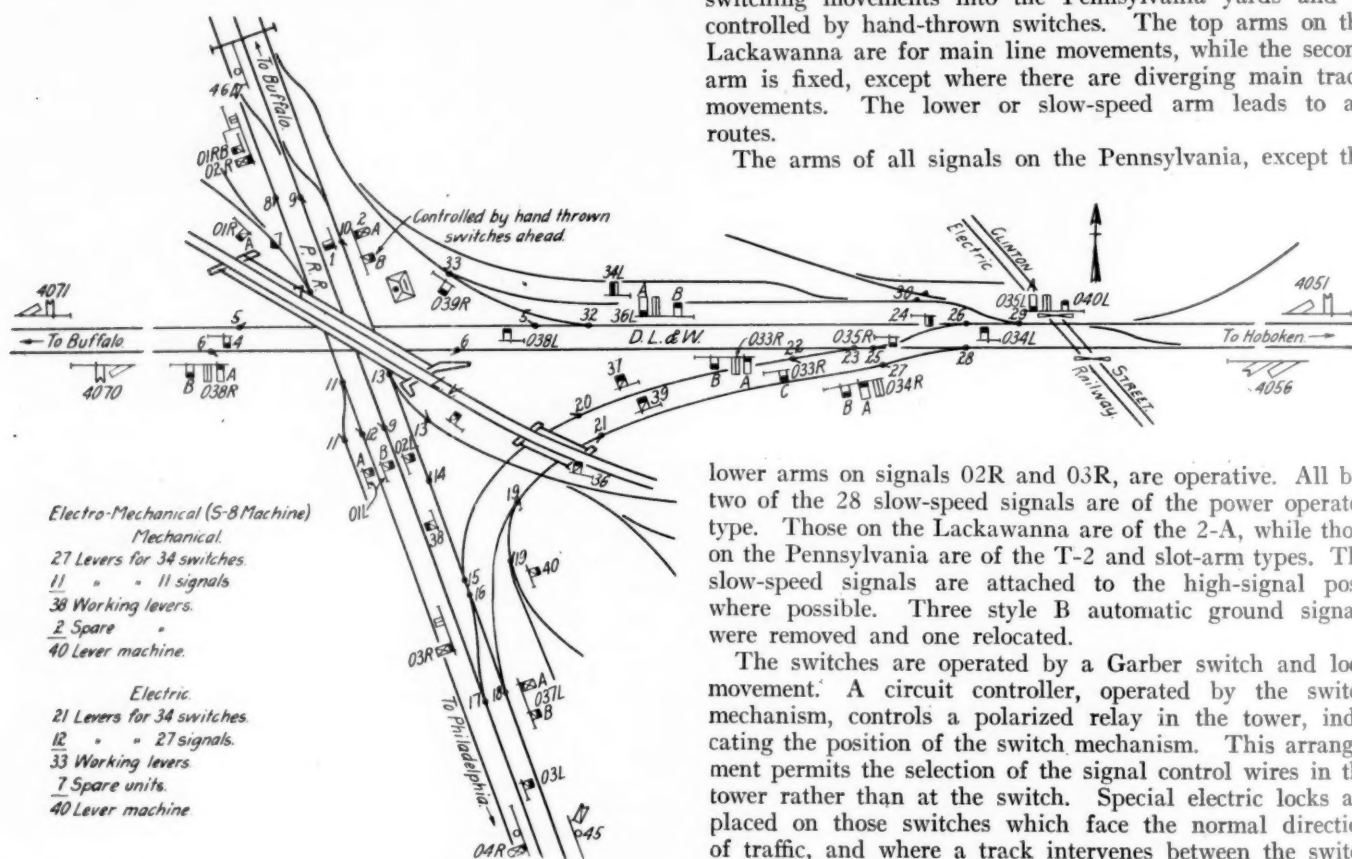
angle irons, is the illuminated track model. The model board, made in the signal repair shop at Hoboken, is of 1/2-in. ebony asbestos board, and shows the various tracks, track circuits and signals. The clear position of each signal and the condition of each track circuit is repeated on the model board by a 1 1/4-watt, 12-volt, candelabrum type electric lamp that is operated on a 6-volt circuit. About 80 lights repeat the various signal and track indications. Two manipulation charts, mounted on the side of the model board, assist the towerman in picking out the proper levers for the indicated movements.

The line relays and the signals, in the limits of the interlocking, are operated from a 14-cell, 18-volt, type A-6, 225-a. h. storage battery. Outside the interlocking limits 16 cells of BSCO battery operate the distant signals, while 12 cells operate the line circuits. Three cells of BSCO battery, connected in multiple, operate each of the 40 track circuits. A fixed resistance unit, varying from 0.1 to 0.3 ohms,

Standard approach, detector and route locking circuits are used. Several clockwork time releases are provided in connection with the approach locking circuits on the high signals. A trap circuit is installed on the dead section of track at the Clinton street trolley crossing, just ahead of signal 035 on the Lackawanna. Several telephones, attached to the signal cases and located at convenient points, permit communication with the tower.

The signals on the Lackawanna are of style B, two-position, lower-quadrant type, while those on the Pennsylvania are of the style B and T-2, three-position upper-quadrant types; except that the distant signals are two-position, upper-quadrant, operating from 45 to 90 degrees. The normal position of the distant signals is at 45 degrees. The style B signals on the Pennsylvania are equipped with the proper attachments for giving the necessary upper-quadrant indications. Pennsylvania signals 04R and 2 are used as block signals. The lower arm on signal 2 is used for switching movements into the Pennsylvania yards and is controlled by hand-thrown switches. The top arms on the Lackawanna are for main line movements, while the second arm is fixed, except where there are diverging main track movements. The lower or slow-speed arm leads to all routes.

The arms of all signals on the Pennsylvania, except the



Track and Signal Layout of the Delaware, Lackawanna & Western Plant at Bailey Avenue, Buffalo, N. Y.

is connected in series with each track battery. The track batteries are housed in battery chutes, while the sets of signal and line batteries are housed in 20-way wooden battery boxes.

The storage battery is charged by a 1-kw. direct connected, 220-volt, 60-cycle, single-phase motor generator set. A two-panel switchboard controls the charging apparatus and the various lighting circuits. Power is distributed over the plant at 110 volts for supplying the five 75-volt lighting transformers for the operation of the signal lights. Each signal arm is lighted by a 5-watt, 13-volt Mazda lamp operated on a 10-volt circuit.

The pole line circuits outside the interlocking limits required 30 miles of No. 9 double-braid weatherproof iron wire, and 52 miles of insulated wire was used outside and 18,000 ft. inside the tower. No. 8 iron bond wires, with duplex channel pins, were used on rail joints.

lower arms on signals 02R and 03R, are operative. All but two of the 28 slow-speed signals are of the power operated type. Those on the Lackawanna are of the 2-A, while those on the Pennsylvania are of the T-2 and slot-arm types. The slow-speed signals are attached to the high-signal post, where possible. Three style B automatic ground signals were removed and one relocated.

The switches are operated by a Garber switch and lock movement. A circuit controller, operated by the switch mechanism, controls a polarized relay in the tower, indicating the position of the switch mechanism. This arrangement permits the selection of the signal control wires in the tower rather than at the switch. Special electric locks are placed on those switches which face the normal direction of traffic, and where a track intervenes between the switch and the pipe line. This prevents the switch being unlocked by a disarrangement of the pipe line.

The entire work was handled by the Buffalo division construction forces of the Lackawanna, under the direction of and with plans furnished by M. E. Smith, signal engineer. We are indebted to B. T. Anderson, assistant signal engineer, for the above information.

**IMPORTANCE OF COAL IN INDIA.**—In more than one respect coal is the most important mineral mined in India. According to the Indian and Eastern Engineer, it gives direct employment to about 180,000 persons, its value at the place of consumption in India or the port of export is greater than that of all the other minerals taken together, and nearly the whole quantity is used in industrial processes in the country, exports to places outside India being for the last six years under 5 per cent. Practically every industry in India is dependent upon coal for the production of power.





Tenryugawa Bridge (19 200-ft. spans), Tokaido Line.

# The Progress of the Japanese Railroads\*

## Part 2—A Discussion of Track, Roadway, Signal Standards, Locomotive and Car Practice and Administration

By Sukehiko Goto

Civil Engineer for the Imperial Government Railways, Tokyo, Japan.

THE standard gage of the Japanese railways is 3 ft. 6 in. and the spacing of tracks is normally 12 ft. center to center, although 13 ft. is used on some of the main lines and 14 ft. on electrified lines. The side and vertical clearance, as shown in the diagram, are very small. The standard roadbed on tangent tracks is 16 ft. wide with ballast sections as shown on the typical cross section. The ruling grade is usually  $2\frac{1}{2}$  per cent. The rails are mostly 60 lb. or lighter, but renewals on main lines are being made with 75-lb. rails of A. S. C. E. section. Originally the English bull head rails were used, but these are no longer in track.

Timber cross ties are used, usually of chestnut wood. The standard dimensions are  $5\frac{1}{2}$  in. by 8 in. by 7 ft. On tangent level tracks 14 or 15 ties are laid to the 33 ft. rail or 13 or 14 to the 30 ft. rail. On some of the less important lines only 12 ties are used. An exception to the above standard is found on the Abt rack railway, where steel ties have been installed. The bridges consist principally of steel truss and plate girder spans, having a maximum span length of 300 ft. These are designed for a live loading corresponding to Cooper's E-33, E-40 and E-45.

In contrast with conditions in America the local stations in Japan usually serve a dense population, calling for a considerable amount of railway business. In consequence practically all stations must be supplied with rather extensive track and station facilities. Station platforms follow the English standard and are as a rule two feet above the top of the rail. Station buildings are usually of wood construction. Engine houses formerly followed the English rectangular design of brick construction, but the American roundhouse type has been adopted in recent years. The diameter of turntables is usually 60 ft.

Single track lines predominate, but the Tokaido and other heavy trunk lines are double track with a few sections of

four track lines. On not a few sections of the system daily train movements amount to 30 or more on single track and 60 or more on double track. This heavy traffic density is made possible by the short distance between stations which generally averages between three and four miles.

Mileage of tracks in operation on December 31, 1915	
Single track .....	5,000 miles
Double track .....	734 miles
Through tracks .....	1 mile
Four tracks .....	16 miles
Six tracks .....	4 miles
Total main line.....	5,755 miles
Yard and side tracks.....	2,277 miles
Total all tracks.....	8,840 miles

The number of stations including all block stations is 1,537.

Switching in Japan is generally done by the usual drilling method, and it is only within recent years that gravity classification yards have been taken into consideration. The first hump yard to be placed in operation is at the Tabata station in the northern suburb of Tokyo, which forms the largest classification yard in the country. It is one and one-half miles in length and contains 24 miles of tracks. Twenty-four hundred cars can be handled through this yard in a day. Work is now in progress on a similar yard for the Shinagawa station which will be much larger.

### GRADE REDUCTION

Owing to the mountainous character of a large part of the Japanese islands, railway location has been difficult in many portions and has entailed the use of heavy grades and sharp curvature. Grades of  $3\frac{1}{2}$  per cent and curves of 9 deg. are common, and in the case of the Abt rack line over the Usui pass a  $6\frac{1}{2}$  per cent grade was used. On the Kagoshima line, a large number of switch backs were required.

As traffic increased, it has been necessary to resort to reconstruction with a view to reducing gradients and improving the alinement. The most important reconstruction work has been done on the Tokyo-Kobe line, particularly the

\*Part 1—A general account of the history, growth, organization and traffic of the Japanese railways appeared in the *Railway Age Gazette* of October 12, 1917, page 646.

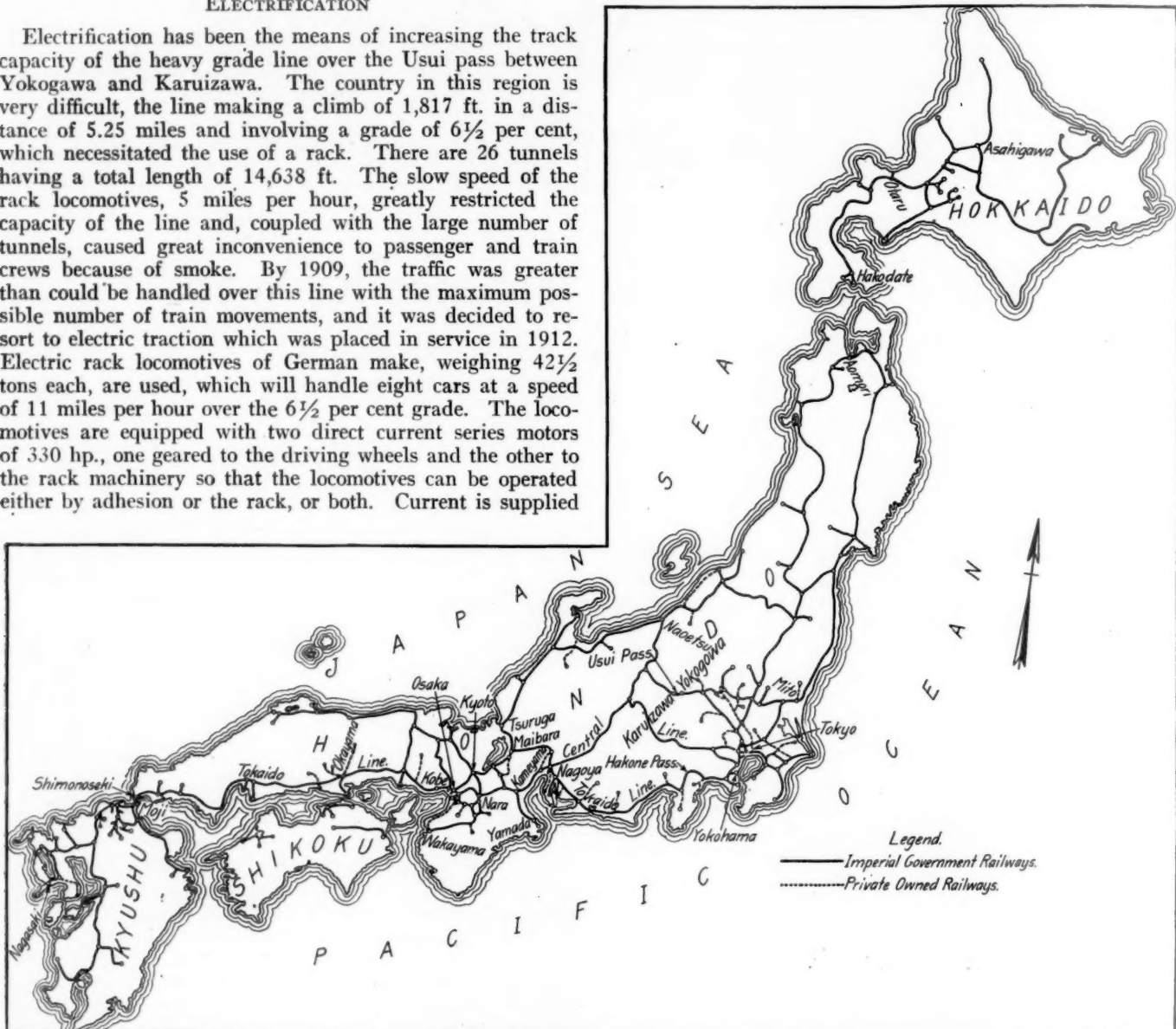
Tokyo-Yokohama section, where the traffic is heaviest. As originally constructed, the grades on this line were 2 and  $2\frac{1}{2}$  per cent, and they have been reduced by reconstruction to 1 per cent, with a maximum curvature of  $5\frac{1}{2}$  deg. One of the largest betterment projects under way at present is the relocation of the line over the Hakone pass between Kozu and Numazu. The new location will reduce the grade from  $2\frac{1}{2}$  per cent to 1 per cent and shorten the mileage from 37 miles to 30 miles. It involves the construction of a tunnel 5 miles in length. The character of this project is shown on a map and profile.

#### ELECTRIFICATION

Electrification has been the means of increasing the track capacity of the heavy grade line over the Usui pass between Yokogawa and Karuizawa. The country in this region is very difficult, the line making a climb of 1,817 ft. in a distance of 5.25 miles and involving a grade of  $6\frac{1}{2}$  per cent, which necessitated the use of a rack. There are 26 tunnels having a total length of 14,638 ft. The slow speed of the rack locomotives, 5 miles per hour, greatly restricted the capacity of the line and, coupled with the large number of tunnels, caused great inconvenience to passenger and train crews because of smoke. By 1909, the traffic was greater than could be handled over this line with the maximum possible number of train movements, and it was decided to resort to electric traction which was placed in service in 1912. Electric rack locomotives of German make, weighing  $42\frac{1}{2}$  tons each, are used, which will handle eight cars at a speed of 11 miles per hour over the  $6\frac{1}{2}$  per cent grade. The locomotives are equipped with two direct current series motors of 330 hp., one geared to the driving wheels and the other to the rack machinery so that the locomotives can be operated either by adhesion or the rack, or both. Current is supplied

The most recent development is the electrification of suburban service between Tokyo and Yokohama, a distance of 18 miles which was opened for traffic in 1915.

Six hundred volts direct current is used on all of the lines. On the initial projects the double trolley system was used, but the single-trolley rail-return system was adopted on all the later lines, and it is now proposed to change the older systems to the single trolley system. Thus far the electrification applies only to suburban service involving trains of two or three cars. The latest plan under consideration is the use of electric locomotives to handle the through



Map of Japan Showing Railways

at 600 volts, using the third rail on the main track and an overhead system on side tracks and yards. Under the operating system in use the locomotives are usually used double headed. Steam power, is, however, still used on the rack section for handling freight trains.

Electrification has also been adopted for suburban service in and around Tokyo. This had its inception in 1907 on a suburban belt line, the Yamanote, which serves as an outer connection for most of the main lines radiating from the city. Following this, several lines were electrified for short distances into the suburbs and later electric power was introduced on a line passing through the center of the city.

trains on the Tokyo-Kobe line within the city limits of Tokyo.

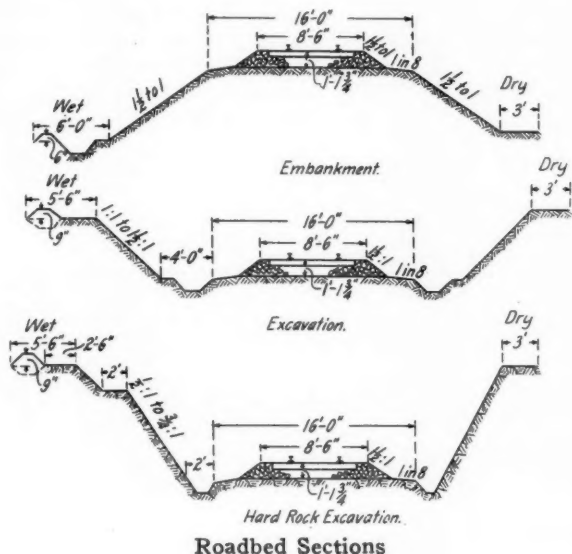
#### IMPROVEMENTS AT TOKYO

Terminal improvements of an important character have been under way in the city of Tokyo for a great many years, of which the most important is the construction of the new Tokyo central station and a through connecting line to afford a direct junction between the Tokaido or main western line with the Northeastern line. Formerly these two railroads had separate terminals three miles apart, known respectively as the Shimbashi terminal and the Ueno, located on opposite sides of the business center of the city. The only connection



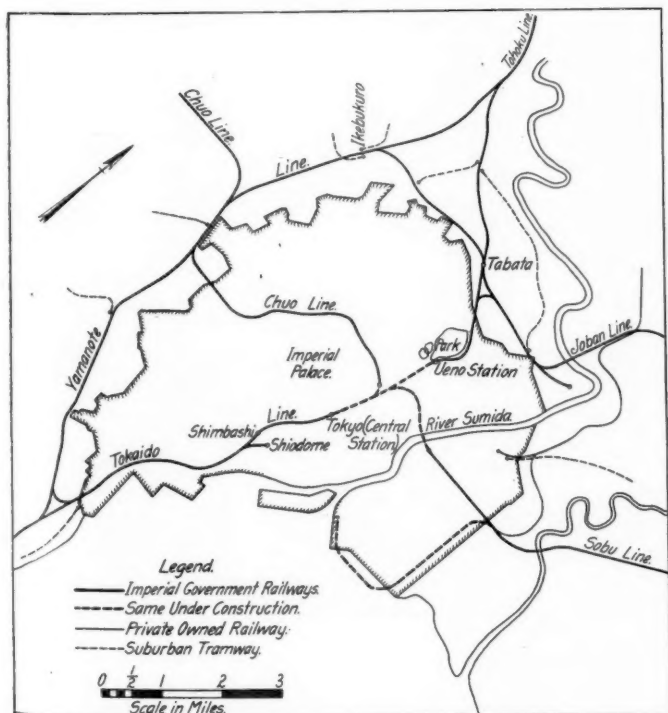
between the two railway systems was by means of the Yamanote belt line, a line of low capacity which has become greatly overtaxed with increased traffic.

The construction of the connecting line through the center of the city with a single station to serve both railroads was



Roadbed Sections

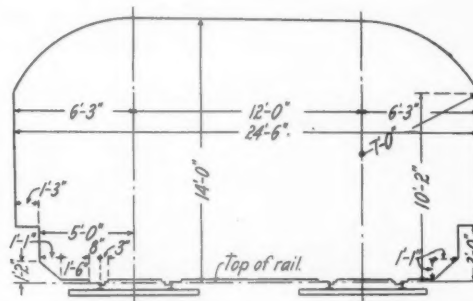
under consideration as early as 1896, but little was accomplished other than the purchase of some of the property until after the Russo-Japanese war of 1904-05. The central station was completed in 1914 as well as a portion of the connecting line, while the rest of it is still under construction. The completion of the new station has made it pos-



Map of Tokyo and Vicinity

sible to transform the old Shimbashi station into a freight terminal, and in this connection it is planned to make extensive terminal developments in the vicinity of the southwestern entrance to the city, where a considerable area of land has been made available by reclamation from Tokyo bay.

The connecting line referred to above is an elevated structure carrying four tracks, two of which are used for suburban service and two for through train service, operated by electric traction and steam respectively. Except for a small portion of the line, the tracks are carried on masonry and steel viaducts, concrete or brick arches spanning between masonry piers being the standard construction with steel plate girder structures supported on steel columns for the

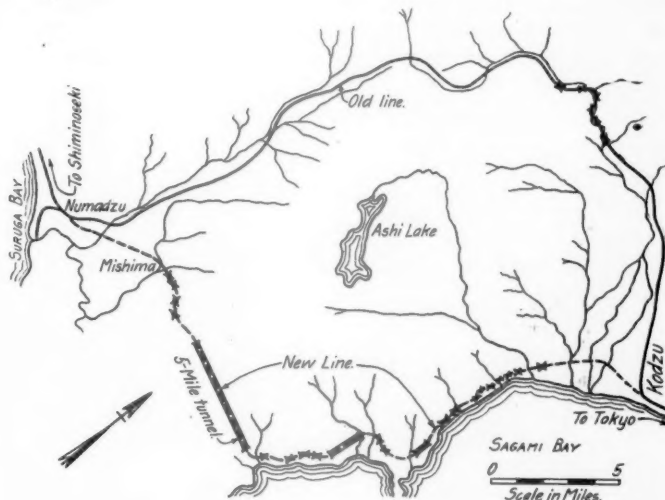


Standard Clearance Diagram

street subways. The floor thickness was reduced to a minimum by the use of half-through girders with solid floors.

#### SIGNALING

The safety system on Japanese railways has very much in common with that in use on English roads. Traffic on main lines is handled exclusively under the block system, the manual block instrument being used on double-track lines and the tablet controlling block apparatus on single-track lines. The electric lines are protected by automatic



Map and Profile of the Hakone Pass Project

signals of the Hall type. Semaphores are in general use on main lines, while disc signals are used on sidings. The important stations are provided with mechanical interlocking, while at smaller intermediate stations, where traffic is not heavy, a very simple interlocking method is in use.

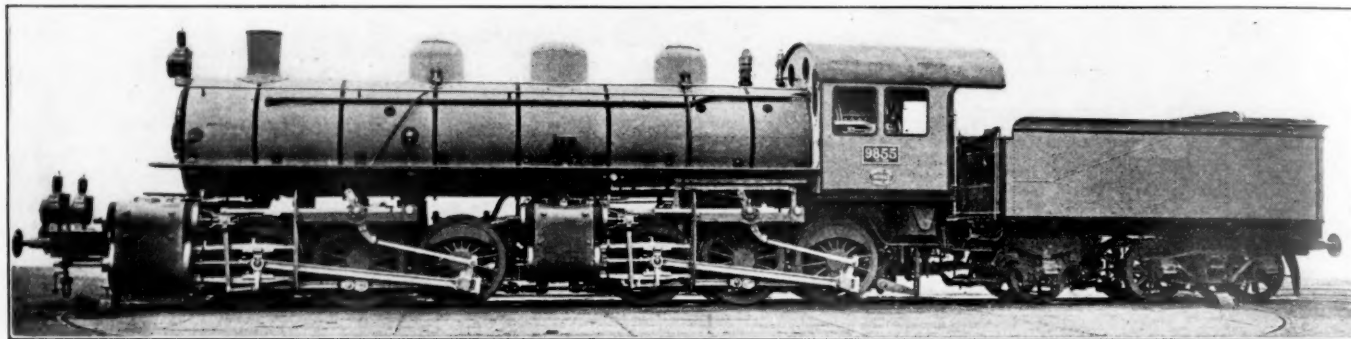
Siemens & Halske's interlocking apparatus, designed for use with the block system, has recently been installed between Kyoto and Kobe, one of the heaviest traffic sections of the steam lines in Japan, where the number of daily train movements is 60 and more, and where the interlocking and block systems in use on the other steam lines were found inadequate to insure safety.

#### LOCOMOTIVE PRACTICE

In the initial stage of the Japanese railways all the construction work was undertaken by English engineers, and

throughout the system. A further advance in this direction was represented by 4-4-2 and 2-6-0 types, which were installed in 1911 on certain of the main trunk lines on which these locomotives are now generally in use for through passenger service.

The freight locomotives of the tank type consist mainly of 0-6-0, 0-6-2 and 2-6-2 wheel arrangements, the number of 2-6-4 and 4-6-2 types being very small. In the closing years of the era of Meiji a number of 0-10-0 type engines were designed for use on heavy grades. Among the freight engines, with tenders, 2-6-0 types claim the bulk of the stock,

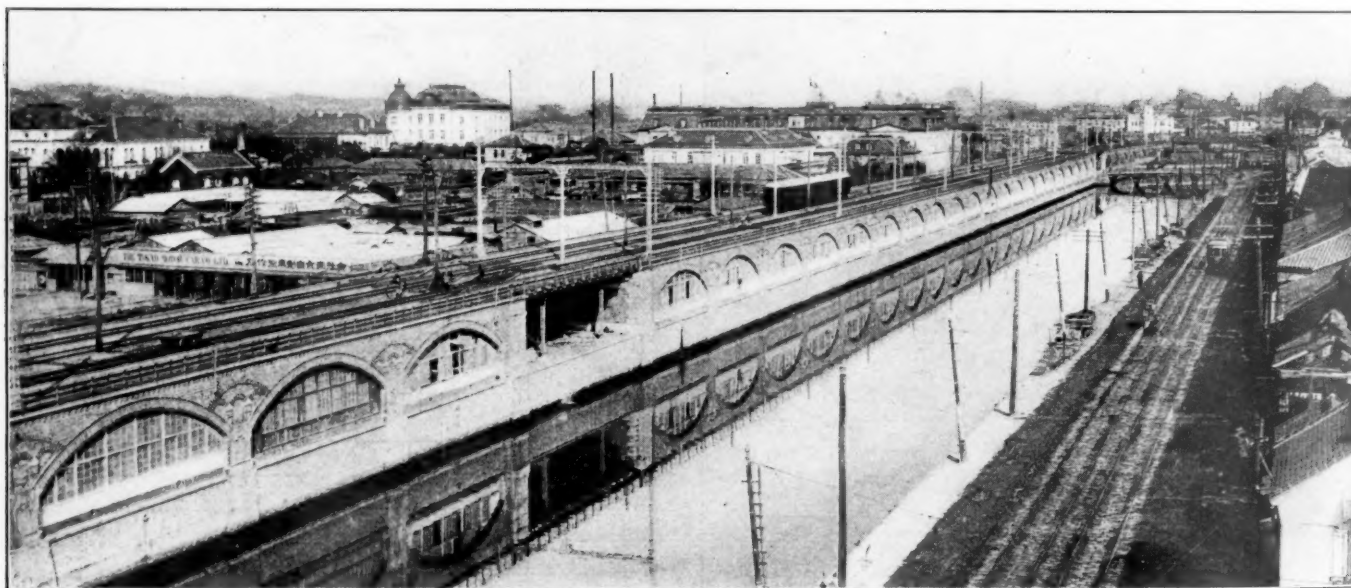


Mallet Type Locomotive of German Make

the locomotives in use were imported exclusively from England. That country long maintained a place as the guide of railroading in Japan, monopolizing the supplying of equipment for many years. From 1887, however, motive power of American and German manufacture began to come in and toward the close of the period under review the locomotives made in America claimed a far greater proportion of the whole stock than those of England. A few engines were also imported from Switzerland, while others were built

the remainder being of the 2-8-0 and 2-8-2 types. Toward the closing years of the Meiji era, the demand for 2-8-0 types increased and a number of 0-6-6-0 Mallet compounds were ordered from the United States.

Only a few locomotives were designed specially for service in yards. The greater part of those now employed in this work are engines which have been transferred from freight service when increases in traffic rendered them no longer capable of handling the road work. With the in-



Track Elevation in Tokyo

in workshops in Japan. However, these were insignificant in number as compared with those introduced from England, Germany and America. It may be noted that, while Japan has never failed to keep up with the latest standards of locomotive practice in the Occident, she has done practically nothing for which she could claim originality.

The wheel arrangement for tank locomotives in passenger service has gradually advanced from 2-4-0 to 2-4-2, while that for the tender type passenger engines has developed from 0-4-2 to 4-4-0, the latter type being the most common

crease of train load, not only 0-4-0, but 0-6-0 locomotives of the smaller type were found inadequate for switching purposes, and in consequence a number of 0-6-0 of larger type and 0-6-2 engines were withdrawn from the main line service for use in large yards.

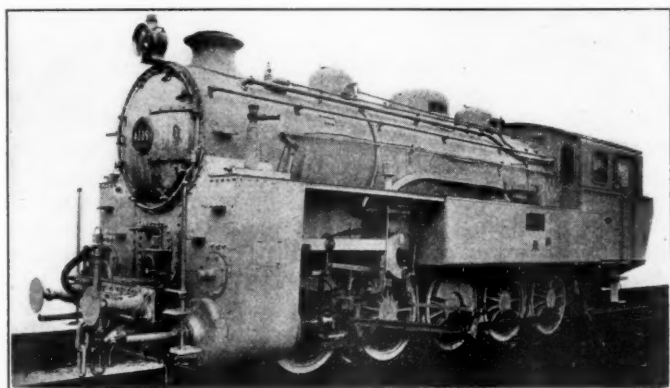
Like the Americans, the Japanese have failed to realize satisfactory progress with compound engines which are looked upon as the natural and most efficient form of locomotive in Europe. The first compound locomotive installed upon Japanese railways was put to work in May, 1893. A



small number of additional compound engines were added year after year, but the stock of this type was by no means great, totaling only 54 out of a total of 2377 in 1912. The reason why the compound principle as applied to the locomotives has failed to commend itself to Japanese practice lies in the fact that its structure is extremely complicated. Japanese railways are diversified by the presence of a great number of grades, and this fact makes it impossible to work the compound engines to advantage, while in addition various difficulties attend the design of four-cylinder compounds adaptable to the narrow gage railways.

Japan has adopted superheated locomotives extensively. Occidental practice has been applied here, although it is interesting to note that about 1902-3, when the Schmidt superheater was coming into general use a smokebox superheater was manufactured for trial purposes in Japan, but the test did not develop the desired results. The adoption of the Schmidt superheater in Japanese railways dates from 1911, when some engines ordered from Germany were put in service on the State Railways. These were followed by other locomotives ordered from America.

Because of English influence the continuous vacuum brakes were adopted and are now in general use. Locomotives on the Hokkaido Colliery Railway were equipped with Westinghouse compressed air brakes, but these were sub-



Largest Tank Locomotive in Japan

sequently taken out of service for the purpose of standardizing the operating equipment on the State Railway system. The rack rail locomotives over the Usui Railway are provided with band and counter-pressure brakes.

From the first, couplers of the English pattern were employed on the Japanese railways not only for locomotives imported from England but also for those imported from other countries. The English types were also used in Kyushu which is separated from the main island by the Shimonoseki strait, while, in the Hokkaido, automatic couplers of American type were adopted by the government lines. Apart from the fact that the English type compels men to go between cars, the maximum tractive capacity of the coupler of this description is anything but adequate, and it is not unlikely that the limitation upon its strength may finally hamper the necessary development of the motive power itself. Viewed in this light, the American coupler is judged as a decided improvement upon the English. The only disadvantage inherent in its structure is that the coupler does not admit of being partially remodeled, and the trouble of wholesale reconstruction involved in the remodeling of the coupler has so far deterred the railway management from bringing about the important reform, save for a slight improvement effected in the matter of strength.

#### FUEL

Fuel for use in locomotives was at first furnished mainly by coal of high quality produced in the islands of Kyushu

and Hokkaido. After years of careful inquiries into the relative merits of products of various localities, the railway management has succeeded in effecting an important saving in this item of cost by the wise selection of coal of the kind which is at once economical and efficient.

About 1898 a trial use was made of oil, and it gave good satisfaction, while emitting very little smoke. These advantages coupled with the low price which generally obtained at that time, induced the railway management to adopt oil in part of the engines employed on the Usui, the Shin-Etsu, and the O-U lines. However, as a result of the gradual rise in the price of oil, the use of liquid fuel was found uneconomical and was discontinued.

In the initial stages of Japanese railways all locomotives were imported from England through the medium of English merchants and were operated by English engine-men. It is true that during 40 years of railway development marked progress was made in the matter of speed, tractive power, design and material, but for all that, Japan failed to reach a state of independence as regards a supply of equipment. The greater part of the stock in use on the State and private railways was represented by engines ordered from abroad. They were built in accordance with the specifications of the Railway Board with respect to the general arrangement and the dimensions of the principal parts, but Japan was dependent solely upon the design and workmanship of foreign mechanics for the details.

From about 1893 spasmodic attempts were made to manufacture locomotives at more than one railway shop in Japan, but these shops, originally designed for the repair of engines, were inadequately equipped for manufacture. It was not until 1896, with the establishment of the Kisha Seizo Kaisha in Osaka, that the corner stone was laid for the locomotive industry in Japan. The nationalization of the railways gave no small impetus to the work of car-building in Japan, and in 1908 the Kawasaki Dockyard Company commenced building locomotives at the branch plant at Hyogo. By 1910-11 the two foregoing plants attained a state of great efficiency in the matter of workmanship as well as capacity. The result was the gradual shrinkage of foreign imports and in 1912 the entire order of new engines for the next fiscal year was given to these two plants.

The steady progress made in the building of locomotives at home encouraged the manufacture of parts and appurtenances, and at present this has also reached a stage of independence, although the country is still dependent upon foreign manufactures for the supply of materials. Because of the efforts of the railway authorities in helping forward Japan's locomotive industry more than \$2,000,000 was kept at home through the stoppage of foreign importations of engines.

#### RAILWAY RESEARCH WORK

Technical test work on Japanese railways began in 1907 when a laboratory was created to conduct tests and experiments on cement, volcanic ashes, fuel, paints, oils and fats and all other kinds of railway materials with a view to furnishing proper guidance to purchasing officers. In 1912, the scope of work in the laboratory was extended to cover technical research on all matters relative to railway materials. Special attention is paid to articles of Japanese production with the idea of fostering domestic industry. Still more appreciable are the results of investigation with a view to the improvement of railway materials.

A second laboratory was established in 1912 with the object of investigating the physical properties of railway materials. The functions of this laboratory are to make tests upon the principal items to be purchased to investigate specifications for purchase; to test the efficiency of finished materials; and to examine the rejected materials and trace the cause.

A locomotive testing plant was constructed in 1911 to de-

termine the proportions of locomotives and parts best suited for the narrow gage lines of the railways, and to ascertain the relative values of the different kinds of coal. The plant is of practically the same pattern as that of the Pennsylvania Railroad at the Louisiana Purchase Exhibition. During 1914-15, 19 tests were conducted on the efficiency of locomotives in addition to the making of chemical analyses of 137 kinds of fuel and the trial burning of 46 kinds of coal.

In view of the prospective shortage in the supply of the Japanese chestnut timber which represents the bulk of cross tie material for the railways, technical research was started regarding possible substitutes. Some 40,000 ties of Japanese chestnut, obtuse ground cypress and 10 other kinds of timber were procured, and after creosoting, were laid in the different tracks in order to ascertain their actual service.

#### EDUCATION

In order to meet a growing need for technically-trained help it was decided in May, 1909, to provide an institution to give vocational education to railway employees. A number of district institutes were established in the different divisions for the purpose of instructing young employees in practical knowledge directly bearing on outdoor work, while a central institute was created at Tokyo to cover railway technology of a higher character. Students were selected by examination from among the employees in the general offices and among graduates of the district institutes, special care being taken in filling up the classes with students possessed of reliable character and practical ability as demonstrated in their actual service.

Although the institutes showed very satisfactory results, the arrangements of their courses developed a tendency toward purely academic exercises rather than the practical study of railroading. Accordingly, the regulations of both the central and district institutes were revised in 1913 to establish a more emphatic distinction between the two, the first being devoted to the scientific study of railway business in general, and the latter to teach and train apprentices for a term of six months in practical station and engine house service. The central institute was divided into four courses, business, mechanical, electrical and English language, while the school term was extended to 18 months.

Accompanying the classroom work, the students are taken on excursions at frequent intervals, making a round of visits to various tourist points and manufacturing centers where they observed the relation of business to freight traffic. Special attention was paid to acquainting the students with general features of railways as the minds of railway employees are too liable to run in the narrow grooves defined by the scope of their immediate duties.

Dormitories were provided to train the students in regular habits under the charge of a special inspector, so that they may learn to qualify themselves for the life of co-operation essential to railway service in which the maintenance of discipline among the rank and file is of no less importance than in the army.

The roll of students at the central institute for 1914-15 included a total of 134, while 80 were graduated. During the same year the district institutes graduated 2,002 students, of which 357 took the regular business or technical course and the rest took special instruction—328 for conductors or stationmen, 667 for firemen, 45 for motormen, 439 for telegraph operators, 64 for car inspectors and 182 for enginemen.

#### SAFETY FIRST IN JAPAN

"Safety First" work on Japanese railways is still in a primitive stage. In September, 1913, an accident prevention committee was organized in the Railway Board under the supervision of the vice-president to investigate accidents and make suggestions for preventing their recurrence. About that time the existing local safety associations were reorganized and unified so that the co-operation among

the units might be fully insured. Separate meetings of the working forces are held monthly at various points on the line to discuss safety matters and various divisional meetings are also conducted.

Each employee is subjected to a physical examination at the time of his employment, and in case of enginemen and firemen the examination is made regularly once a year. A number of experts are sent around to deliver lectures on sanitation to employees, and circulars and bulletins on sanitary and medical matters are distributed from time to time. Special attention is paid to the provision of sanitary arrangements for workshops.

#### RELIEF ASSOCIATIONS

Relief provision was maintained under the old regime, but the sums allowed were inadequate. After the nationalization of the leading private railways a relief association was organized based on a labor insurance system. Under the new arrangements a material increase was effected in the grants made in case of injuries sustained in the discharge of duties, while death and old age benefits were fixed at graded rates determined in consideration of age, wages and tenure of service. Lastly the allowance of refunds of the subscription was provided for in case of withdrawal from service. The stock fund of the association consists of subscriptions from the members and an annual government subsidy to the amount of 2 per cent of the aggregate earnings of the members.

Membership is compulsory or optional, according to the nature of the service. The roll of the association on March 31, 1915, shows 105,854 members, of which 94,402 were compulsory members, 534 optional members and 10,918 of a special class. There are several grades of grants, depending upon the seriousness of the injury, varying from an amount equal to wages for a period of one year and seven months to two years and six months, to an amount equal to six months' wages. The government furnishes medical attention and hospital services free to railway employees injured on duty.

#### TRAIN ACCIDENTS IN AUGUST

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of August, 1917:

Collisions						
Date	Road	Place	Kind of accident	Kind of train	Kil'd	Inj'd
1.	Norfolk & W.	Rippon.	bc	F. & F.	2	5
1.	N. Y. N. H. & H.	Willimantic.	bc	P. & F.	0	15
5.	Chicago M. & St. P.	Milwaukee.	bc	P. & P.	5	0
8.	N. Y. Central.	Geneva.	xc	F. & F.	2	0
15.	Ches. & Ohio.	Mead's.	xc	P.	0	1
15.	Southern Pac.	Hafed, Nev.	bc	F. & F.	4	0
15.	M. K. & Tex.	Watauga.	bc	P. & F.	2	4
19.	Penn.	E. Pittsburgh	xc	F. & F.	3	2
21.	N. Y. Central.	Albany	xc	F. & F.	0	0
†24.	Peoria & E.	Mansfield	rc	F. & P.	2	11
24.	M. K. & Tex.	Wilton, Mo.	bc	F. & F.	1	1
30.	Ky. & Ind. Term.	Louisville.	bc	P. & F.	0	1
Derailments						
Date	Road	Place	Cause of derailment	Kind of train	Kil'd	Inj'd
2.	Balt. & Ohio.	Frederick.	neg.	F.	2	4
5.	Central Ga.	Hatcher's.	washout	P.	..	..
†7.	Natchez, U. & R.	Urania, La.	unx	F.	5	0
17.	N. Y. Central.	Gouverneur.	derail	F.	2	0
20.	N. Y. N. H. & H.	Hartford.	acc. obst.	P.	0	2
20.	N. Y. N. H. & H.	Saybrook J'n.	acc. obst.	F.	0	0
22.	Toledo & O. C.	Lime City.	unx	P.	1	27
†30.	Gulf Coast L.	Cholpe, La.	.....	P.	2	4
31.	Southern	Constitution.	.....	P.	1	1
Other Accidents						
Date	Road	Place	Kind of accident	Kind of train	Kil'd	Inj'd
11.	Western Md.	Connellsville.	boiler	F.	0	2

† Abbreviations and marks used in Accident List:  
 rc, Rear collision—bc, Butting collision—xc, Other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, Unexplained—derail, Open derailing switch—ms, Misplaced switch—acc. obst., Accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P. or Pass., Passenger train—F. or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.



The trains in collision at Rippon, W. Va., on the 1st were through freights, and 4 engines and 10 cars were wrecked. Two firemen were killed and 5 other trainmen were injured. The wreck took fire but the fire did but little damage. The collision was due to the concurrent failure of trainmen and an operator. The men in charge of the northbound train overlooked a meeting order and an operator failed to display his stop signal.

The trains in collision at Willimantic, Conn., on the 1st were an eastbound passenger train and a locomotive without a train, running west. The collision occurred within yard limits and both trains were moving at moderate speeds. Fifteen passengers were slightly injured. The light engine was not running under control as required by rule.

The trains in collision at Milwaukee, Wis., on the night of the 5th were through passenger trains. Both engines were damaged. Five persons were killed; the engineman of Train No. 3 and four trespassers riding on the end of the mail car of Train No. 58.

The collision at Geneva, N. Y., on the 8th occurred within yard limits. Two light engines moving south collided with another light engine moving north. Two employees were killed. The cause of the collision was a mistake in hand signaling; the men in charge of the southbound engines (173 and 1785) acted on a motion from a switch tender which was intended for engine No. 3783.

The train involved in the collision at Mead's, Ky., on the 15th was westbound passenger No. 23. The train collided with a car standing on the main track which had escaped control on a mine track, where it was being moved down grade by mine employees. The engineman was injured and about 25 persons in the coaches were slightly hurt by broken glass. The car had escaped from the mine track because of the failure of a deraul to stop it. The deraul was spiked to an unsound tie and the car pushed it to one side.

The trains in collision on the Southern Pacific at Hafed, Nev., on the 15th were eastbound extra freight No. 2516 and a westbound local freight. Both engines and ten cars were wrecked. One engineman, one brakeman, one other employee, and one trespasser were killed. The eastbound train had passed a distant signal at caution but had not been promptly brought under control; and the westbound had encroached on the right of the eastbound, trying to reach Hafed when there was not time to do so.

The trains in collision at Watauga, Tex., on the evening of the 15th were a northbound passenger and a southbound freight. The freight had been brought to a stop and was being backed into a side track. The engineman and fireman of the passenger train were killed and four passengers were injured.

The trains in collision at East Pittsburgh, Pa., on the 19th were an eastbound through freight and another freight which was switching on the main track. Ten cars were wrecked and the conductor, engineman and one brakeman of the through freight were killed and two trainmen were injured. The cause of the collision was disregard of a stop signal by the through freight.

The trains in collision at Albany, N. Y., on the 21st were an eastbound "hill pull," a light engine and a "yard pull." Three locomotives and several cars were damaged. The "hill pull" became uncontrollable on a steep descending grade and collided with a light engine, which was not in motion, and this in turn struck the "yard pull," near North Pearl street. As the "hill pull" departed from West Albany yard, a knuckle opened on the west end of fourth car, and, following this the angle cock was closed to enable trainmen to release the air brakes. When the train was recoupled it appears that the brakeman neglected to open the angle cock and the men in charge of the train neglected to test the brakes, thus leaving the train with insufficient brake power.

The trains in collision at Mansfield, Ill., at 1 a. m. on

the 24th were eastbound passenger No. 44 and a following freight train. The passenger train was standing at the station, and the rear car, a sleeping car, was wrecked. Two passengers were killed and 11 were injured.

The trains in collision near Wilton, Mo., on the 24th were westbound freight No. 93 and eastbound freight No. 72. Both engines and two cars were damaged. One trespasser was killed and one injured. The cause of the collision was that train No. 72 had become more than 12 hours late (thus losing its right to the road) and had not been protected by flag. The westbound train had stopped.

The trains in collision on the Kentucky & Indiana Terminal at Louisville, Ky., on the 30th were a passenger train of the Baltimore & Ohio, drawn by a locomotive of the Kentucky & Indiana Terminal, and a freight train being pushed by a locomotive of the Illinois Central. The engine of the passenger train and three cars of the freight were wrecked. The fireman of the passenger train was injured.

The train derailed near Frederick, Md., on the 2nd was an eastbound freight. Two trainmen were killed and four were injured. A car in the middle of the train was derailed, and fell in front of a westbound freight which was passing at the time and 18 cars were derailed. The car in the eastbound train was buckled and knocked off the track when the slack was closed up by two pushing engines.

The train derailed near Hatcher's Station, Ga., on the evening of the 5th was passenger No. 20. The first three cars were thrown off the track at a washout and a passenger coach was ditched. The injuries are all reported slight.

The train derailed on the Natchez, Urania & Ruston, near Urania, La., on the 10th was a freight train loaded with logs, descending a grade. The locomotive was overturned and five persons were killed. These were a woman and three children riding on the locomotive and the engineman, the engineman having been scalded fatally while trying to release the woman and children from beneath the overturned locomotive. The cause of the derailment is reported as not ascertained.

The train derailed near Gouverneur, N. Y., on the 17th, was a northbound freight. The engine was thrown off the track at a derailing switch and fell down a bank; and the engineman and fireman were killed.

The train derailed on the New York, New Haven & Hartford, Valley division, at Hartford, Conn., on the 20th was a northbound passenger. The engine was overturned and the engineman and fireman were injured. The derailment was caused by a plank which had been placed as a barrier by street repairers, and had been knocked down onto one rail of the track.

The train derailed near Saybrook Junction, Conn., on the 20th was an eastbound locomotive with no cars. It was thrown off the track and overturned at a crossing by striking an automobile. The engineman and fireman escaped with slight injuries. Out of 9 persons in the automobile, 8 were killed.

The train derailed at Lime City, Ohio, on the 22nd was an excursion carrying the Columbus Retail Grocers' Association. The engine was overturned, and a traveling fireman, riding in the cab, was killed. Twenty-five passengers and two trainmen were injured. The derailment was caused by spread track. An officer of the road writes that "just what spread the track is as yet undetermined, a peculiar feature being that the track was spread not only at the point of derailment, but for a distance of some 300 feet beyond the point where the train finally stopped. This spreading, of course, could not have been caused by the derailed train, as it did not pass over this 300 feet of track. Whether this spread was caused by a loose wheel, or something dragging on some train which passed ahead of the derailed train, is as yet undetermined. Another peculiar feature is that eight trains had passed over this track in the

preceding 12 hours, and the engineers in charge of these trains all testify that there was nothing noticed to indicate that there was anything wrong with the track. Of these eight trains, three were passenger trains."

The train derailed on the Gulf Coast Lines, near Cholpe, La., on the 30th was eastbound passenger No. 2. The derailment was due to the breaking of a switch as the train passed over it. The first two cars were overturned. One passenger was killed and the conductor, engineman and four passengers were injured, the conductor fatally.

The train derailed near Constitution, Ga., on the 31st was local passenger No. 4. The engine and the baggage car were overturned, and the engineman and fireman were seriously scalded. The engineman subsequently died of his injuries.

The train involved in the accident near Connellsville, Pa., on the 11th was a westbound freight. The boiler of the locomotive exploded and the engineman and fireman were injured.

*Electric Car Accidents.*—Of the 12 serious accidents on trolley roads in August, two had fatal results; the butting collision at North Branford, Conn., August 13, in which 19 persons were killed, and a derailment at Wellsley Hills, Mass., on the 26th, when one man was killed.

### SPEED LAWS HAMPER RAILROAD EFFICIENCY

It is well known how both railroads and shippers have co-operated to meet the emergencies created by our entrance into the war. Typical of the carriers' response to the needs of the nation was the united action of the railroads within five days after the declaration of war to merge the transportation lines of the country into one great operating organization. No less important in contributing to the increased carrying power of the railways have been the effective efforts of shippers throughout the nation to diminish delay in handling cars and to load them to maximum capacity. It has remained for T. J. Foley, vice-president in charge of operation of the Illinois Central, to point out the great loss in transportation efficiency caused by unreasonable speed restrictions imposed upon the carriers by many cities and towns throughout the country. In a letter addressed to trainmen and enginemen Mr. Foley estimates that if the speed restrictions were abolished the railroads of the country could haul 4,373,952 additional freight cars a distance of 100 miles, or 75,023,520 additional tons of freight a distance of 100 miles in the course of a year. In this letter Mr. Foley said in part:

"It would seem that the only slack left in the railroads is the slack which the people themselves, who are asking for maximum efficiency, have placed in them. Little impediments to operation, in the aggregate, constitute great obstructions. For instance, on the Illinois Central system there are 480 speed restrictions. Practically every hamlet, town and city has its speed restriction, the great majority of which are six miles an hour for freight trains. These restrictions, in many instances unreasonable in the extreme, constitute an enormous burden on interstate commerce. On the main line of the Illinois Central between New Orleans and Chicago there are 91 places where the speed of freight trains is restricted, either by ordinance or state law, the total distance embraced in these restrictions being 57 miles. There are 48 places where passenger trains are required to reduce speed to six miles per hour. Between Omaha and Chicago there are 36 speed restrictions for freight trains and the same number for passenger trains. Many of the places where trains are required to slow down to six miles an hour are mere villages.

"The loss of time resulting from complying with unreasonable speed restrictions on the Illinois Central system is equivalent to a day's work of 49,883 men in each year. This waste is particularly burdensome at this time when the

shortage of labor is a tremendous handicap to efficient operation. Ten thousand more men could now be used on the Illinois Central system if they were available. Complying with these restrictions means the waste of 361,533 tons of coal per year, of the value of \$758,030 at present prices. It means the waste of 10,021 locomotive days in each year, and there is an unprecedented shortage in locomotive power. It means the waste of 248,522 freight cars for one day in each year. Figuring this waste, due to unreasonable speed restrictions, another way, I find that if these speed restrictions were abolished, the Illinois Central could haul 99,408 additional freight cars 100 miles per year with the same number of locomotives and men, or it could haul 1,705,080 additional tons of freight a distance of 100 miles with the same number of locomotives and men. Assuming that speed restrictions throughout the United States average the same per 1,000 miles of track as they do on the Illinois Central system, there are 21,200 speed restrictions in the United States. Complying with these speed restriction laws means the loss to the country of 2,203,210 men for one day in each year. It means the loss of 15,967,840 tons of coal of the value of \$33,479,570. It means the loss of 442,550 locomotive days in each year, and the loss of 10,934,968 freight cars for one day in each year. It means that if these unreasonable speed restrictions were abolished the railroads of the country could haul 4,373,952 additional freight cars a distance of 100 miles, or that they could haul an additional 75,023,520 tons of freight a distance of 100 miles in the course of a year. In these calculations, no allowance is made for the loss of time and money occasioned by pulling out draw-bars and damages to equipment on account of slowing down and starting up heavy freight trains, and railroad men will understand that this loss is considerable.

"I have not heard that there is disposition anywhere to co-operate with the railroads by removing unreasonable speed restrictions. Shippers have taken a lively interest in co-operating with the railroads in increasing their efficiency, but the authorities in the villages, towns, cities and states have not done anything. Perhaps this is because they have not been asked to do so. I think it would be meet and proper for you gentlemen to discuss this matter with the people whenever you have an opportunity.

"Speed restrictions are intended to make it safer for pedestrians and occupants of vehicles, both horse-drawn and motor-propelled, regardless of the inconvenience to transportation. It is thought by many that if trains are required to go through towns slowly and softly, with enginemen and trainmen on the lookout, that there will not be so much danger of accidents. The effect of this is to educate the public to become careless about railroad tracks. There ought never to be anything done towards teaching the public that railroad tracks are safe. The public ought to be taught that they are dangerous in the extreme, and the more dangerous they are the more care will be taken by the people themselves to avoid accidents. The idea of placing responsibility on the railroads for safety at railroad crossings is wrong. Crossings considered the most dangerous, we know from experience, are the scenes of fewer accidents than crossings considered comparatively safe. If speed restrictions were removed, in my opinion, accidents would not increase, because the people would become educated to look out for themselves at railroad tracks, instead of depending upon others to look out for them."

**JAPAN GETS BIG STEEL SUPPLY FROM U. S.**—Japan's imports of iron and steel from the United States in September, 1917, touched a new high record. In that month \$13,000,000 worth of iron and steel bars, plates and sheets was imported, compared with less than \$10,000,000 the previous month. This is the first time that iron and steel imports exceeded cotton imports into Japan from the United States.



# Conversion of Freight to Switch Locomotives

Engines Which Were Considered as Practically Obsolete Are Rebuilt and Adapted to Modern Service

By W. H. Hauser

Mechanical Engineer, Chicago & Eastern Illinois.

THE Chicago & Eastern Illinois has an engine class containing sixteen 12-wheel freight engines which were built in 1897 and 1899. When these were first placed in service they were considered among the largest in the country. The size of freight equipment has increased so

be made simply by removing the engine truck and the rear pair of drivers. In the case of our 12-wheelers, however, this conversion had never been considered as the engines were not designed to permit proper weight distribution if this simple plan of conversion were followed. It was found

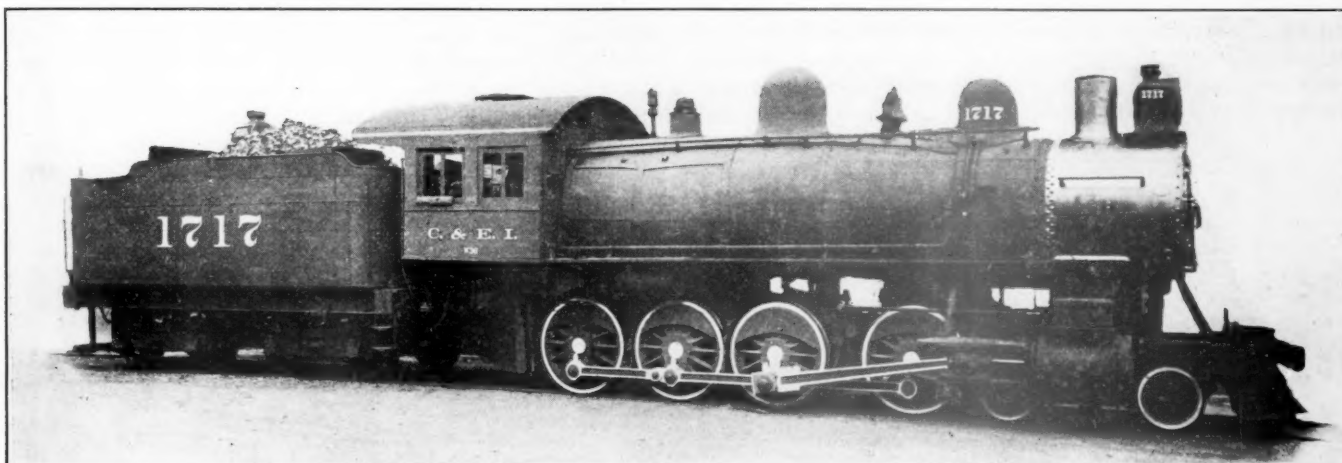


Fig. 1—The Twelve-Wheel Locomotive Before Conversion

greatly, however, that for some time past these 12-wheelers have been relegated more and more to odds and ends of service, with their obsolescent day fast approaching. More recently they frequently have been used in a sort of semi-switching and road service but not with entire success due to their long rigid wheel base. They are well built engines,

necessary to change the wheel spacing in order that the proper wheel loads might be obtained.

One of these engines both before and after conversion is shown in Figs. 1 and 2. It will be noticed that the converted 6-wheel switcher is in general a better looking engine than the original 12-wheeler. Many characteristics of the

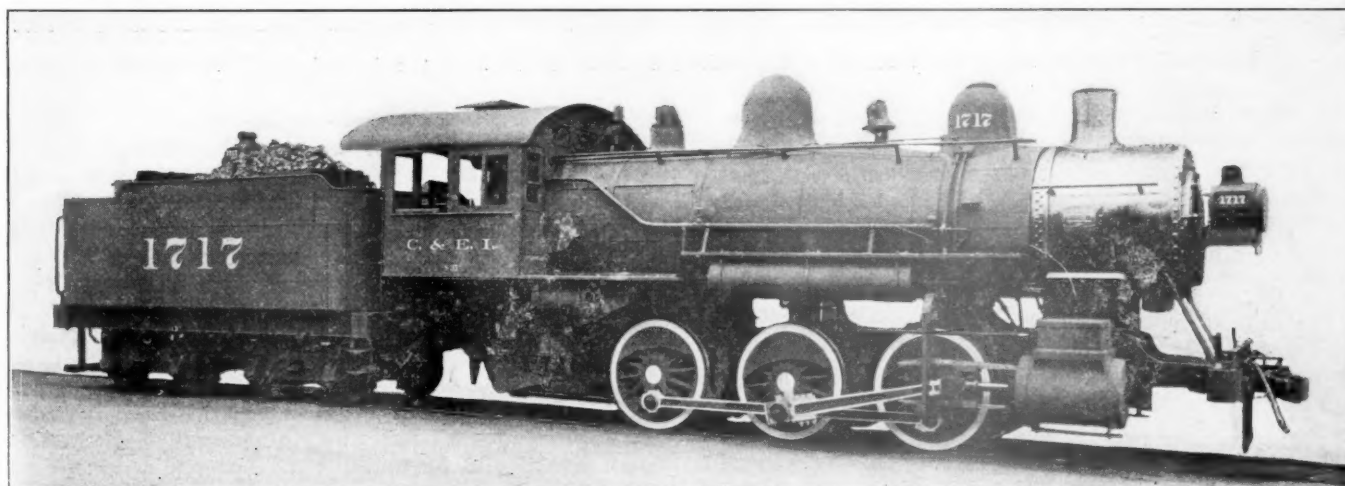


Fig. 2—The Converted Six-Wheel Switcher

however, except for the type of firebox, which is of the O-G type, very narrow and 10 ft. 6 in. long.

On account of growing need of switching power it was proposed to change some of these 12-wheelers to 6-wheel switchers. The idea of converting freight engines with four pair of drivers and an engine truck to 6-wheel switchers is not a new one as it has been practised by other roads where the engines were so designed that the change could

engines are similar, as is to be expected, but some of the more important are quite dissimilar as will be noted below:

	Before conversion, 12 wheeler	After conversion, 6 wheel switch
Service .....	Freight	Switch
Traction effort .....	35,400 lb.	35,400 lb.
Weight in working order .....	175,500 lb.	160,660 lb.
Weight on drivers .....	144,050 lb.	160,660 lb.
Weight on leading truck .....	35,050 lb.	.....
Weight of engine and tender in working order .....	292,300 lb.	263,160 lb.

	Before conversion, 12 wheeler	After conversion, 6 wheel switch
Wheel base, driving.....	15 ft. 6 in.	12 ft.
Wheel base, total.....	25 ft. 4 in.	12 ft.
Wheel base, engine and tender.....	54 ft. 7 in.	45 ft. 2 in.
Weight on drivers ÷ tractive effort...	3.96	4.53
Simple cylinders, diameter and stroke...	21 in. by 26 in.	21 in. by 26 in.
Driver wheel diameter.....	55 in.	55 in.
Boiler, style firebox.....	O-G	O-G
Boiler, working pressure.....	200 lb.	200 lb.
Firebox, length and width.....	126 in. by 41 in.	126 in. by 41 in.
Flues, number and outside diameter...	288—2 in.	288—2 in.
Heating surface, flues.....	2,045 sq. ft.	2,045 sq. ft.
Heating surface, firebox.....	197 sq. ft.	197 sq. ft.
Heating surface, total.....	2,242 sq. ft.	2,242 sq. ft.
Grate, length and width.....	126 in. by 41 in.	94 in. by 41 in.
Grate area.....	35.8 sq. ft.	26.8 sq. ft.
Tender, weight light.....	42,500 lb.	41,000 lb.
Tender capacity, water and coal.....	6,000 gal.—13 tons	5,000 gal.—10 tons

In converting, the locomotives data covering actual or computed weights were collected for the entire locomotive and its various parts. It was found that by lengthening the distance between the second and third drivers by 17 in. and by shortening the distance between the first driver and the center line of the cylinder by the same amount that the weight on all three pair of drivers would be very evenly divided—in fact, more evenly than is frequently the case

this frame as compared with taking down the entire frame and welding it by the blacksmith fire method follows:

Cut and weld with Oxweld  
\$117

Taken down, cut, welded and replaced by the blacksmith fire method  
\$386

There are other minor items in connection with the change in the design of the locomotives such as a new and heavier guide yoke brace and a new cast steel guide yoke. The main rods were shortened 17 in., while the side rods between the second and third drivers were lengthened 17 in. The spring rigging had to be altered but to offset this was the salvaged old springs and the fact that repairs and renewals would have been necessary with the old spring rigging anyway. When the first engine was placed in service it was found that owing to the size of the firebox the firing had to be watched with the greatest care, in fact too closely to permit of economical operation. The engines had always been free steamers in freight service when properly fired, but when placed in switch service they became too erratic. After a few trials this trouble was overcome by disconnecting and laying firebrick over three of the front

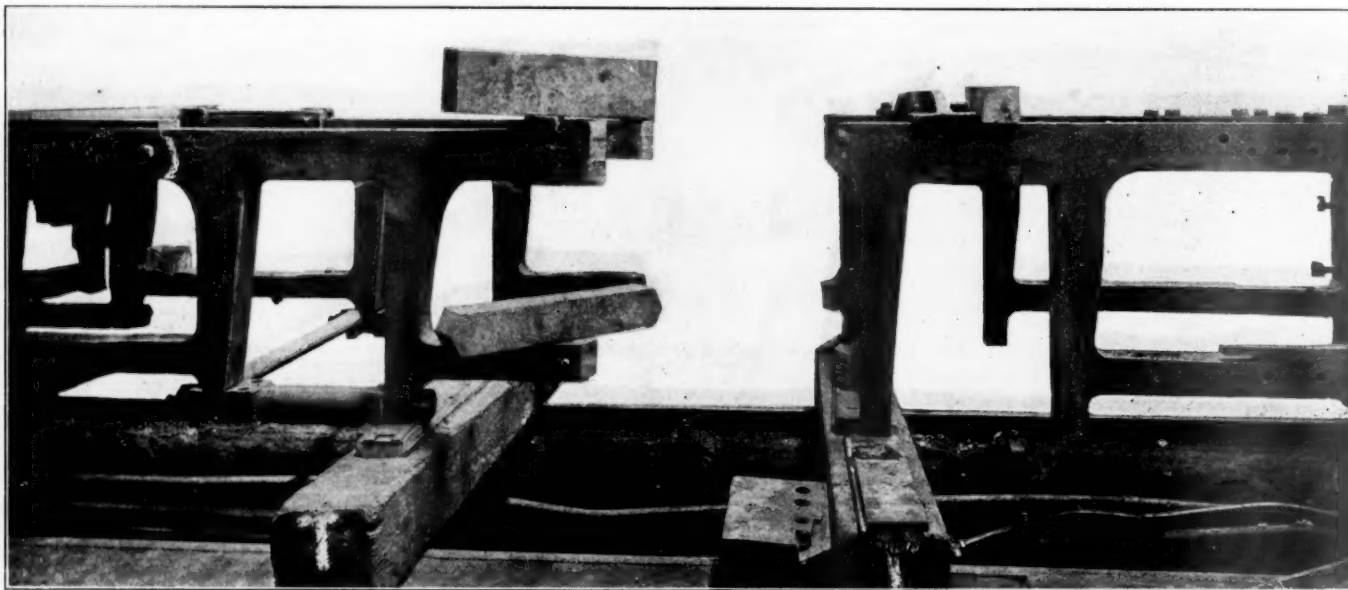


Fig. 3—The Frames Ready for Welding in the Additional Material Between the Second and Third Drivers

with newly built six-wheeler switchers. Below is shown a table of these weight distributions:

	Twelve wheeler, before conversion	Six wheeler, after conversion
Engine truck .....	35,050 lb.	.....
First pair drivers.....	35,050 lb.	50,900 lb.
Second pair drivers.....	35,050 lb.	57,800 lb.
Third pair drivers.....	35,250 lb.	52,000 lb.
Fourth pair drivers.....	35,100 lb.	.....

The method followed in changing the frame was quite novel and interesting. The upper and lower front frames were removed and delivered to the blacksmith shop. Six holes were plugged and welded in the blacksmith shop in the rear end of both top frames in order to match with the holes in the top front tongue of the main frame, while the rear end of the lower front frame was straightened and cut off to fit. The main frames were cut with the Oxweld torch between the second and third drivers and separated and 17 in. of each of the front upper main frame tongues were cut off by the same means.

Fig. 3 shows how the frames looked after the blacksmith and machine work had been completed and they were ready for welding in the 17 in. pieces between the second and third drivers. These pieces were welded in with the Oxweld torch. The finished job had a neat appearance. Cost figures covering the Oxweld method of cutting and welding

grates and building a wall 27 in. high at the rear end of these brick. Since doing this five of the converted engines have operated with great success and the others are to be converted as conditions permit.

The total cost of the extra work attendant on converting a single engine and over and above the general repairs and credits obtained for material removed was approximately \$450. The converted engines have been very successful in service both from a mechanical and operating standpoint.

BRITISH LABOR LEADER OPPOSES EIGHT-HOUR DAY DEMAND.—Speaking recently, J. H. Thomas, the general secretary of the National Union of Railwaymen of England, said that it was painful for him to have to oppose a demand for an eight-hour day, but he could not allow 370,000 men to be involved by 30,000 enginemen. He had been put in a false position. The moral of the recent agitation was to show the absolute futility of sectional unionism. Approximately 143,000 railwaymen had enlisted, 5,000 of whom had made the great sacrifice. Thousands were already back, and many more would return, shattered in mind, body and spirit—mental derelicts. His conception of leadership was not to lead from behind, not to consider whether a thing was popular or not, but having made up his mind a thing was right or wrong, to act regardless of personal consequences.



# A Study of Wood Preservatives and Marine Borers

A Description of Experiments to Determine Effectiveness of Creosote Oils in Preventing Attacks on Piling

By C. H. Teesdale

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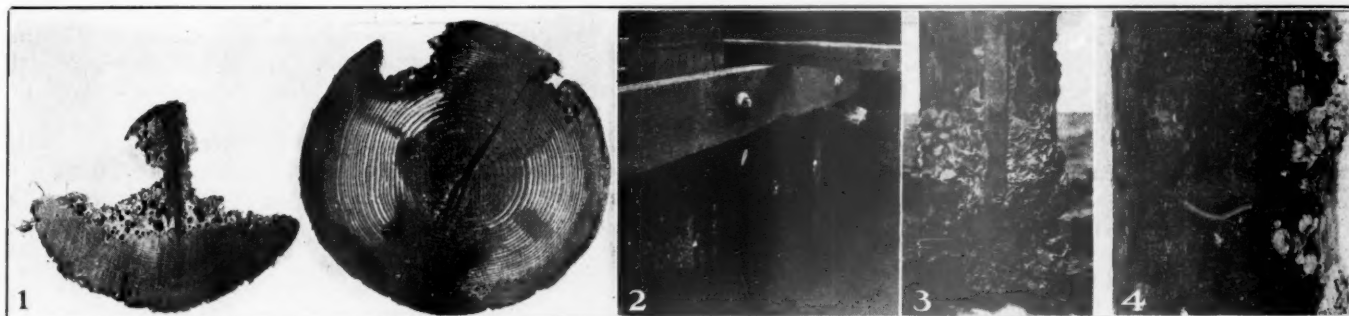
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IT is impossible for one unfamiliar with marine shipping to appreciate the immense annual losses occasioned by the attacks of marine borers against wooden structures—boats' bottoms, harbor piling, and so forth. In the worst infested regions of the Atlantic, Pacific and Gulf coasts unprotected piling will not, as a rule, stand up for more than a single season. The economic losses do not stop with the destruction of wooden structures; for in certain situations their replacement often involves tedious work and much more expense than does their original installation. For instance, it is not infrequently necessary to remove a section from the roof of a warehouse in order to replace destroyed foundation piling.

For hundreds of years search has been made for an efficient protective against the attacks of marine borers. Dur-

a considerable portion of the wharf from which it was taken. In this last case the piles were exposed to the weather on the bank for one year before being driven, which may have been responsible for the short life in service.

There is an element of uncertainty in all except, perhaps, the heaviest treatments. Coal-tar creosote is a highly complex mixture of organic compounds (no two creosote oils being identical in composition), and methods of analysis are limited mainly to fractional distillations carried out under arbitrary conditions, together with determination of a few physical constants. Furthermore, it has not been known whether the effectiveness of a creosote oil against marine borers is due to its toxic constituents, to its viscosity, to high-boiling, practically non-volatile compounds, or to some combination of the foregoing. The development within recent



(1) Section of a Creosoted Longleaf Pine Pile Destroyed by Teredo at Gulfport, Miss. Left-hand Section Taken at Surface of Water and Right-hand Section Taken at Mud Line. (2) Creosoted Longleaf Pine Piles Badly Damaged by Teredo After Four Years' Service at Gulfport, Miss. (3) Creosoted Longleaf Pine Pile Badly Attacked by Sphaeroma After 12 Years' Service at Mayport, Florida. (4) Section of Creosoted Longleaf Pine Pile After 4 Years' Service at Brunswick, Ga.

ing the past 50 years the use of creosote oils, particularly those obtained from coal tar, has made great headway; until at present impregnation under pressure with coal-tar creosote may be considered a standard method of preserving piling. This method is, however, expensive, and its effectiveness by no means invariable. For example, 12 years is about the average life obtained from piling given an 18-lb. treatment and installed at Pensacola, Fla., and it is the practice of one of the railroads to use a tile protection around creosoted piles where renewals are very expensive. The sections in Fig. 1 were taken from a creosoted longleaf pine pile destroyed by xylotrya at Gulfport, Miss., and removed in 1913 after 11 years' service, the cause of failure probably being uneven penetration; Fig. 2 shows the condition of wharf piling at the same place after four years of service, and is typical of about 30 per cent of the piling in the structure driven at the same time. Fig. 3 shows a pile badly damaged by sphaeroma at the mouth of the St. Johns river at Mayport, Fla., after 12 years' service. It was in somewhat worse condition than the average piles in the structure of which it is a part. Fig. 4 shows the condition of creosoted longleaf pine piling after four years' service at Brunswick, Ga. This pile shows heavy attack by limnoria in the creosoted portion, and is typical of

years of a ready market for individual constituents of creosote—the phenols, naphthalene, tar bases, and so forth—has led to the widespread use against marine borers of oils from which these constituents have been removed in part so that the composition of the oils must be widely different from that of the straight distillate oils used 20 to 50 years ago, and it is uncertain how the effectiveness of the oils is impaired. It is these oils, however, that have furnished the service data on which the reputed effectiveness of creosote oils in general has been based.

For a number of years the United States Forest Service has been investigating methods of treatment and the efficiency of various preservatives, taking records on actual service tests, in an effort to overcome this destruction of timber by marine borers. At the same time the United States Bureau of Fisheries has been studying the life histories of the various borers. Since 1914, these bureaus have been working jointly on the problem, and have published annual reports of progress made, this being the third such report.

The first series of tests was started in 1911 and 1912 with treated specimens of southern yellow pine, each about six inches in diameter and two feet long. Specimens treated with coal-tar creosote fractions were installed at Pensacola, Fla., Gulfport, Miss., and San Francisco, Cal., and speci-

mens treated with various other preservatives were installed at Gulfport and San Diego. A second series of tests was started by installing additional specimens in 1914 and 1915. The pieces treated with coal-tar creosote fractions in 1911 were given an absorption of 18 lbs. per cu. ft. and the later ones an absorption of 8 lbs. per cu. ft.

SUMMARY OF TESTS IN ALL LOCATIONS AFTER 5 TO 6 YEARS' SERVICE.

Preservative.	No. of specimens.	Condition.					
		No attack.	Very slight attack.	Slight attack.	Medium attack.	Severe attack.	Very severe attack.
Fraction I.....	16	..	..	..	..	8	6
Fraction II.....	16	..	..	..	..	5	4
Fraction III.....	16	..	..	..	..	4	1
Fraction IV.....	16	..	2	..	..	..	1
Fraction V.....	16	..	..	..	..	..	..
Coal-tar creosote.....	20	..	..	..	14	..	..
Copperized oil.....	8	..	..	..	..	..	7
Water-gas tar creosote.....	8	..	..	..	4	..	..
Hardwood tar.....	8	..	..	..	..	..	..
Timber asphalt.....	8	..	..	..	..	..	..
Untreated.....	24	..	..	..	..	..	24

Comparing the results obtained on the five fractions of creosote, it was noted that there was a progressive increase in resistance to attack as the boiling point of the preservative was raised. Thus, all of the specimens treated with Fraction I were either severely attacked or destroyed, while only one treated with Fraction V was destroyed. Those treated with coal-tar creosote were about comparable to those treated with Fraction IV. The high boiling water gas-tar creosote was almost as effective as coal-tar creosote. Of the other preservatives used, copperized oil, hardwood tar, timber asphalt, and Spiritine were not at all effective. Hence, it is concluded that products of petroleum and of the distillation of hard and soft woods are not effective in preventing attack by marine borers.

The later experiments indicate that low boiling water gas-tar distillates are ineffective. Zinc chloride or copper salts added to crude oil were of little value, while ferric chloride or copper salts added to creosote considerably increased the resistance, especially to limnoria attack. Naphthalene added to creosote decreased its resistance to the borers, especially limnoria. While the results indicate that additions of tar to creosote reduced the resistance to attack, this was due to the fact that the tar increased the difficulty of penetration, and, with the low 8-lb. absorptions, resulted in narrow poorly penetrated strips near the surface, in which the borers obtained a start. Where the specimens were well treated, the general surface conditions indicated that tar increased the resistance to attack to a considerable extent. Ferric acetate solutions were of no value.

The shipworm, xylotrya (often confused with a less common relative, teredo), is perhaps the most destructive borer in American waters, and though a microscopic organism at the time of its entrance into a piece of wood, it may attain a length of several feet and a diameter of an inch. Widely different from this mollusc is the tiny crustacean borer, limnoria, which rarely attains a length above one-eighth inch, and yet because of vast numbers is fairly destructive. In spite of the great structural differences between these two forms, their reactions toward creosote poisons were strikingly similar. This was determined from the following summary, which applies equally to both xylotrya and limnoria. Over 1,000 specimens of xylotrya and more than 12,000 limnoria were used.

The preparations investigated consisted of the creosote and creosote fractions used in the above described service tests; a series of creosote light oils; a series of tar acids; a series of tar bases, and a series of crystalline coal-tar hydrocarbons. The light oils tested were benzol, toluol and a mixture of the isomeric xylols. The tar acids consisted of

phenol, orthometa—and para-cresols and alpha—and beta-naphthols. The samples of mixed tar bases consisted of four fractions obtained by the Hempel distillation of crude bases. The temperature limits of these distillates were, respectively, 94 to 167 deg. C., 170 to 210 deg., 210 to 250 deg., and 250 to 315 deg. Experiments were also made with a sample each of pure pyridine and of synthetic quinoline. The crystalline hydrocarbons studied were naphthalene, acenaphthene, phenanthrene and anthracene.

1. The toxicity of creosote fractions *decreases* as the boiling point rises; that is, the creosote and its distillates, arranged in the order of decreasing toxicities, are: Fraction 1, fraction 2, creosote, fraction 3, fraction 4, fraction 5. The high toxicity of fraction 2, which was solid with naphthalene, was probably due mainly to tar acids.

2. The creosote light oils are definitely poisonous for the borers. Benzol is the most, and xylol the least toxic. The toxicity of toluol lies between these two.

3. The tar acids are all highly poisonous to the borers. Their toxicity steadily *increases* with a rise in molecular weight; that is, arranged in order of increasing toxicity, they are: Phenol, the cresols and the naphthols. The three isomeric cresols, which exert practically the same degree of toxic action, are about twice as poisonous as carbolic acid; while the two naphthols, also equally toxic, are ten or more times as poisonous as phenol.

4. Tar-base fractions all show a high toxicity for the borers; and this toxicity *increases* with a rise in the boiling point of the fractions. Pure quinoline, boiling at 239 deg. C., is several times as poisonous as pyridine with a boiling point of 115 deg. The toxicities of the tar bases are fairly comparable with those of tar acids of approximately the same boiling points.

5. In comparison with the tar acids or bases or even the lighter hydrocarbon oils the solid hydrocarbons of creosote are only very slightly toxic. Arranged in the order of decreasing effectiveness, they are: naphthalene, phenanthrene, acenaphthene and anthracene. Naphthalene is perhaps five times as toxic as anthracene.

It has apparently been assumed that the more poisonous a creosote oil is the more effectively will it prevent attacks of marine borers. It will be noted, however, that the conclusions drawn from these direct toxicity tests, especially with reference to creosote and its fractionates, are diametrically opposed to the conclusions drawn from the service tests above; that is, the highest boiling fraction, which was the least poisonous, stood up the best in actual service. But it does not follow that some of these observations must be inaccurate, nor that toxicity is not a factor in the preservative action of creosote oils. It seems worth while to consider this point in some detail, if only to show how involved is this problem of marine borers.

The data for the first six preservatives indicate that the practical efficiency of these preservatives is a function of the high-boiling constituents that each contains. For example, Fraction I, which was the least effective, had a residue above 225 deg. C. of 8.1 per cent; whereas Fraction V, the most effective, had a residue above 320 deg. C. of 89.8 per cent. Coal-tar creosote, with an efficiency between that of its lowest and its highest-boiling fractions, had a residue above 320 deg. C. of 25.8 per cent. Now, it is not improbable that the high-boiling, relatively non-volatile constituents tend to prevent the loss of lower boiling, poisonous substances. With such an assumption, it is easy to reconcile the apparently conflicting results of the service tests and the toxicity experiments.

Although the writers are convinced that the proportion of high-boiling constituents in a creosote oil is a large factor in determining its value for marine work, they are also inclined to believe that other though more obscure factors may



play an important part. It seems possible, for instance, that the tar acids and bases, which were found to be the most poisonous constituents of creosote, may be combined chemically in a creosote to form relatively non-poisonous compounds. Another and perhaps more reasonable assumption is that the high-boiling acids (e. g. naphthols) and bases (e. g. quinolines), which are readily miscible with high-boiling neutral creosote oils, but only slightly soluble in sea-water, will be found to have a very low coefficient of distribution between the neutral oils and the sea-water in comparison with lower boiling acids (e. g. phenol) and bases (e. g. pyridine), which are much more soluble in sea-water. The writers expect to test these assumptions experimentally in the near future.

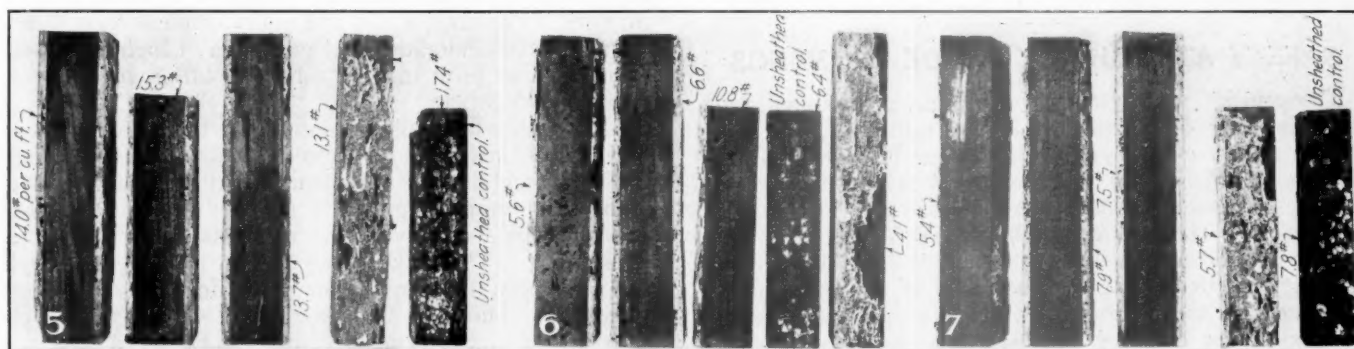
Users of creosoted piling have been greatly puzzled occasionally on observing shipworms boring through heavily creosoted wood. The writers have themselves seen this; but on following the burrows back, have very frequently found that the point of beginning the attack was at a spot which had received, if any, only very superficial treatment. These observations furnished the basis for a series of service tests to determine whether shipworms would pass from untreated into treated wood; and, if so, whether the type of treatment would determine the extent of their attack.

Rectangular sticks of sap loblolly pine, about 3 in. by 3 in. by 36 in., finished on all sides, were treated at the

5 to 7. The last shows that naphthalene, alphanaphthol, phenol and benzol, in the proportions in which they were present, were ineffective in these service tests. Perhaps the most striking point, however, about these tests was the fact that in each of the sheathed specimens treated with creosote or its fractionates the borers passed from the untreated sheathing into the cores; whereas the unsheathed controls in this group were unattacked.

The interpretation of these unexpected results lies in the peculiar life history of the shipworm. The latter invariably begins its attack on wood as a free-swimming larva, microscopic in size. At this time it is readily killed by traces of poisons which may leach slowly from the surface of unsheathed creosoted specimens. But when such a larva has once obtained a foothold in the wood, it undergoes a radical metamorphosis and grows with great rapidity, so that it may attain a size thousands of times that of its larval state in two or three weeks. This great increase in size is accompanied by a corresponding increase in resistance to creosote poisons; so that shipworms, which by some chance have obtained a foothold, may ultimately be enabled to burrow with apparent impunity through heavily treated wood.

The value of high-boiling coal-tar creosote oils for this purpose may be considered as established, but further investigation is necessary to establish the value of specifying high-boiling acids and bases in oils for marine work. A



(5) Sheathing Experiments. Heavy Treatments With Most Toxic Creosote Distillate—Fraction 1. No. 5 Unsheathed Control. Sheathing Practically Destroyed. Attack on Treated Cores, Though Definite, Is Rather Superficial. No Sign of Attack in No. 5. (6) Light Treatments, With Straight Creosote of Medium Toxicity. Depth of Borings Average  $\frac{1}{4}$  inch. No. 4 Not Attacked. (7) Light Treatments with Least Toxic Creosote Distillate—Fraction 5. Attack on Treated Cores Fairly General, But For Most Part Extremely Superficial. No Sign of Attack in Unsheathed Control.

Forest Products Laboratory with creosote I and the several fractions. A series of treatments was also made with special preparations as follows: (a) Benzol, 90 per cent; (b) re-sublimed naphthalene, 25 per cent, in gas oil; (c) pure phenol, 5 per cent, in gas oil; (d) alphanaphthol, 1 per cent, in gas oil; (e) gas oil. After treatment the majority of the sticks were sheathed completely with untreated half-inch sap pine boards secured from the same source as the treated wood. The sheathing was surfaced on the side in contact with the treated core, and was secured to the latter with brass screws. One specimen in each treatment was left unsheathed as a control. The purpose of the sheathing was merely to serve as bait for the microscopic free-swimming shipworms, and later as shelter for the borers until they should attain a size sufficient to render them easily observable. The main object of these experiments, however, was to study the reactions of the borers on reaching the treated cores.

The specimens were shipped to the U. S. Fisheries Station, Beaufort, North Carolina, and were installed in Beaufort Harbor in the middle of June, 1915—about five weeks after treatment. They were allowed to remain in the sea-water for six months, and were then taken up and examined.

The results of these tests are illustrated in part in Figs.

liberal content of acids and bases would do no harm, and if these results have practical significance, they strongly indicate that they would increase the effectiveness of an oil.

The following specifications were adopted at the 1917 convention of the American Wood Preservers' Association and provide a distillate oil containing more high-boiling constituents than any previously adopted for use in pressure treating plants. While it was intended for treating paving blocks it is also the best specification thus far adopted that could be used for piling. Such an oil need be used only in the most heavily infested waters. At least 22 lb. per cu. ft. should be injected.

The oil shall be a distillate of coal-gas tar or coke-oven tar. It shall comply with the following requirements:

1. It shall not contain more than 3 per cent of water.
2. It shall not contain more than 0.5 per cent of matter insoluble in benzol.
3. The specific gravity of the oil at 38 deg. C. shall be not less than 1.06.
4. The distillate, based on water-free oil, shall be within the following limits:  
Up to 210 deg. C. not more than 5 per cent.  
Up to 235 deg. C. not more than 15 per cent.
5. The specific gravity of the fraction between 235 deg.

and 315 deg. C shall be not less than 1.02 at 38 deg./15.5 deg. C.

The specific gravity of the fraction between 315 deg. and 355 deg. C. shall be not less than 1.10 at 38 deg./15.5 deg. C.

6. The residue above 355 deg. C., if it exceeds 10 per cent, shall have a float-test of not more than 50 seconds at 70 deg. C.

7. The oil shall yield not more than 2 per cent coke residue.

8. The foregoing tests shall be made in accordance with the standard methods of the American Wood Preservers' Association.

#### SUMMARY

1. The economic losses due to the activities of adult shipworms can never occur as long as treatments of wood for marine structures are able to prevent attack by the microscopic and apparently insignificant shipworm larvae.

2. Heavy treatments with a proper type of creosote will still prove inadequate as long as areas of superficially treated sapwood, heartwood, knots, and so forth, are left exposed for the lodgment of shipworm larvae.

3. It appears that a proper creosote oil for marine work should contain a large proportion of constituents boiling above 320 deg. C., as well as considerable amounts of high-boiling tar acids and bases.

### SAFETY AT HIGHWAY GRADE CROSSINGS

The general use of cautionary highway crossing signs (corresponding to distant signals on railroads), the most notable improvement that has been made in crossing safety for many years, is now provided for by law in eight states, namely: California, Connecticut, Illinois, Maine, Massachusetts, New Hampshire, Oklahoma and Vermont.

This and other interesting information concerning grade crossings and trespassing may be found in the report of the committee on these subjects, which was presented at the meeting of the National Association of Railway Commissioners at Washington, October 16. Bills providing for the signs have been presented to the legislatures in a number of other states. Most or all of the laws which have been passed contemplate the fixing of these signs at 300 feet from the tracks. New Hampshire, which was the pioneer state in this matter, reports that the cautionary signs are already in use, but that they are not of the same design as that later adopted or approved by the association. In Vermont the situation is similar to that in New Hampshire. In Connecticut the sign must be furnished by the railroad, but will be set by the city or town. In California, the law requires vehicles approaching grade crossings of railroads to run not faster than 15 miles an hour. Tennessee has a law requiring drivers of automobiles to come to a full stop before crossing tracks. Texas requires them to slacken to six miles an hour at all crossings except those protected by gates or flagmen. The State of Washington has passed a law requiring automobiles carrying passengers to stop before crossing tracks.

The painting of black and white diagonal stripes on crossing gates, and the use of disks instead of flags by crossing watchmen are now regular practice on many railroads in many states.

This report is the most comprehensive review of the grade crossing question which has come to our notice. As to protection of crossings it refers to the action of the association last year, which resulted in joint action (through committees) with the American Railway Association, and the adoption of important standards. On the subject of elimination of grade crossings the report summarizes some figures which show the enormous magnitude of this problem. There are, in 22 states which have replied to a circular, over 110,000

grade crossings. Basing the calculation on the data received, the committee estimates that in the whole United States there are 200,000 grade crossings; and that at these crossings about 2,000 persons are killed each year. In the 22 states reporting, it appears that only ten per cent of the crossings are protected by gates, flagmen or bells. In a number of states a good deal of progress has been made in the elimination of grade crossings. The leaders in this movement are Connecticut, Illinois, Massachusetts, New Jersey, New York, Oklahoma, Oregon, South Carolina and Wisconsin. Massachusetts, with only about 2,000 miles of railroad, has spent, since 1890, about \$42,000,000 on this work. In Illinois, the work, not begun so early, has involved the expenditure of \$55,000,000, a large share of which was spent within the city of Chicago. New York, with four times as many crossings as Massachusetts, has spent only a little more money, namely, \$44,000,000.

Estimates of what it would cost to eliminate all of the crossings in a state are made in a few cases, running up into the hundreds of millions, of course. In California, the estimate averages \$30,000 to each crossing; in Colorado, \$40,000; in New York, \$48,000, and in Wisconsin, \$25,000.

The committee thinks that every state ought to have a law requiring railroad companies to make some progress in the elimination of crossings every year; and, generally speaking, it is believed that the cost should be divided about equally between the railroads and the public, as is the case in New York. The laws, action and policy of the several states in regard to the elimination and protection of highway grade crossings are set forth in a full abstract, filling 26 pages of the committee's report.

Trespassing, which subject was added to the committee's field of work last year, is treated briefly, attention being called to the fact that the only point of contact between grade crossings and trespassing lies in the fact that the crossing makes the rights of way of the railroads easily accessible to trespassers. The lack of respect for railroad property, which developed in many communities in the early days, still remains; and the American record in the matter of trespassing on tracks is disgraceful. Many states have no adequate laws forbidding trespassing on railroads, and in the thirteen states which have such laws it is common knowledge that trespassing has not been stopped.

The committee sent out a circular of inquiry and found that only in four states do the laws forbid trespassing on rights of way, as distinguished from trespassing on trains; and only one state, Pennsylvania, claims that the laws are strictly enforced. The replies to this circular are summarized in tabular form in an appendix. The almost universal neglect of the statutes on this subject leads the committee to say that the outlook is discouraging. The railroads are fully alive to the situation, and in many cases have been exceedingly active, endeavoring to prevent trespassing; but the public authorities are indifferent. There is a widespread belief that anti-trespass laws are passed at the behest of the railroads, not to protect human lives and limb, but to protect railroad property, and to permit corporations to infringe or seek to infringe upon the liberty of the individual. An educational campaign is necessary to dissipate this erroneous notion.

The committee recommended the passage of federal legislation to eliminate trespassing, but the convention did not adopt the recommendation. The committee thinks that a statute could be framed which would be enforceable either by the federal authorities or by state and local authorities. Aside from this, about all that can be done is to continue the present efforts at publicity and general education of the people. The chairman of this committee is James Blaine Walker, New York Public Service Commission, New York City; and the other members are R. C. Bacon, C. C. Elwell, Alex. Gordon, F. J. Miller, John G. Richards, and B. W. Waltermire.



# Priority Regulations for Railway Materials

## The Methods of Procedure in Securing Supplies and the Extent to Which They Will Affect the Railroads

**B**ECAUSE of the unprecedented demand of the various government departments for iron and steel and their products, for ships, docks, munitions and other supplies for the army and navy, and for construction and other purposes in connection with the war, and because of the unusual needs of the railways and other industries for work urgently necessary in carrying on the war, together with the certainty that non-essential demands on the available capacity must in part, at least, be subordinated to the most urgent requirements, it has been necessary to devise a system of priority to determine the relative precedence in which orders shall be filled.

The determination of relative priority has been placed in the hands of the Priorities Committee of the War Industries Board of the Council of National Defense, located at Washington. Judge Robert S. Lovett, chairman of the executive committee of the Union Pacific, is chairman of this committee and has also been appointed by the President as director of priority of transportation, to administer the powers conferred upon the President by the priority of shipments law. The other members of the committee are: Major General J. B. Aleshire, George Armsby, Rear Admiral N. E. Mason, Edwin B. Parker, J. Leonard Repogle, Rear Admiral A. V. Zane, and R. T. Demsey, executive secretary.

The operation of the priority system must inevitably have an important bearing on the work of railway supply companies and upon even the operation and maintenance of the railways as well as upon their plans for improvements, because the scarcity of materials and supplies necessary to railway work is such that it will be necessary to secure priority orders in order to obtain what is required and precedence must be given to the orders and to the work deemed most essential to the successful prosecution of the present war.

The Priorities Committee has recognized the indispensable character of the service being performed by the railways and has generally followed the practice of classifying requests for priority for railway materials as next in importance to actual war orders.

Directions prescribing the principles to be followed in determining priority were made public in Circular No. 1 issued by the Priorities Committee on September 21, giving instructions as to priority in orders and work for all individuals, firms, associations and corporations engaged in the production of iron and steel and in the manufacture of products thereof. About 25,000 copies of this circular were sent to manufacturers in all parts of the United States, requesting them thereafter to observe the regulations and to give priority in accordance with certificates to be issued by the committee. The circular was signed by Judge Lovett and was approved by the Secretary of War and of the Navy.

Heretofore applications for priority orders have been made direct to the Priorities Committee, but the subcommittee on materials and supplies of the Railroads' War Board, H. B. Spencer, vice-president of the Southern Railway, chairman, which has been keeping in close touch with the work of the Priorities Committee with reference to railway materials and has also conducted investigations as to the needs of the railways for materials and supplies, has now developed a plan by which applications by railroads for priority certificates for work in which they are interested will be sent direct to the office of the subcommittee in Washington and will be handled by it with the Priorities Committee.

The general plan of the priority system is described in Circular No. 1 as follows:

### DIRECTIONS AS TO PRIORITY

During the war in which the United States is now engaged, all individuals, firms, associations, and corporations engaged in the production of iron and steel and in the manufacture of products thereof are requested to observe the following regulations respecting priority, viz.:

1. All orders and work shall be divided into three general classes, Class A, Class B, and Class C, with various subdivisions of Classes A and B, indicated by a suffix number, thus: Class A1, A2, A3, A4, etc., and Class B1, B2, B3, B4, etc.

2. Orders and work in Class A shall take precedence of orders and work in both Class B and Class C, and orders and work in Class B shall take precedence of orders and work in Class C, irrespective of the date the orders were received; and orders and work in Class A1 shall take precedence of orders and work in Class A2, etc., and Class B1 shall take precedence of Class B2, etc.

3. Class A comprises war work; that is to say, orders and work urgently necessary in carrying on the war, such as arms, ammunition, ships, etc., and the materials required in the manufacture of same.

4. Class B comprises orders and work which, while not primarily designed for the prosecution of the war, yet are of public interest and essential to the national welfare, or otherwise of exceptional importance.

5. Class C comprises all orders and work not embraced in Class A or Class B, and no certificate of the Priorities Committee will be required therefor. Any order for work or material not accompanied by a certificate in substantially the form set forth on page three of this circular, to the effect that the work or material falls within Class A or Class B, should be treated as an order for work in Class C.

6. All materials required in the manufacture of an article or in the prosecution of any work will be entitled to take the class of such article or work unless otherwise specified in the certificate covering the same.

7. Certificates in the form set forth on page three of this circular will be issued by the Priorities Committee upon application therefor, specifying the classification of the order or work, and priority should be given accordingly in producing and furnishing the material or supplies, or in manufacturing and delivering the article. Certificates of a subsidiary nature will be issued upon request for the furnishing of material and articles required in manufacturing the article or prosecuting the work ordered.

8. All orders placed prior to the date hereof by or on behalf of the War Department or Navy Department of the United States or the United States Shipping Board Emergency Fleet Corporation should be classed as subdivision A1 of Class A, unless otherwise ordered by the officer placing the order or by the Priorities Committee; and all orders for arms, ammunition, and other military supplies and equipment placed prior to the date hereof by or on behalf of the nations associated with the United States in the war in which it is now engaged should be classed as subdivision A2 of Class A unless otherwise ordered by the Priorities Committee.

9. All orders placed after the date hereof should be classed as Class C unless covered by certificates of the Priorities Committee or other written directions of the said committee.





work considered more urgent. In the case of locomotives precedence was given by direction of the Secretary of War before the priority system was put into effect, in the following order: For the United States government, for the French government, for the Russian government, and for American railways. Of 968 locomotives turned out by the builders between June 1 and the first part of October, 353 were for the United States or foreign governments, and of the 4,120 locomotives on order, 2,490 were for the United States or foreign governments.

However, since the priority plan has been put into effect recognition has been given to the necessity of keeping the railways in a condition to meet the demands upon them for transportation and railway materials in general have been considered as entitled to Class B 1 rating, providing the reasons for requesting priority justify such a rating in each particular case.

This is the highest rating that can be given to anything which is not included under the head of actual war work.

All applications are passed on individually, however, and

Principal Certificate No. B ..... is held by .....  
..... who requests that Subsidiary Certificate  
issue to .....

**APPLICATION FOR SUBSIDIARY CLASS B PRIORITY CERTIFICATE**

....., 191

*Priorities Committee, War Industries Board,  
Council of National Defense, Washington, D. C.*

GENTLEMEN:

You are hereby requested to issue a Class B Priority Certificate subsidiary to your Principal Priority Certificate, No. B....., the requested Subsidiary Priority Certificate to cover an order or contract dated ..... for  
.....  
.....  
placed with .....  
by ..... for delivery .....  
.....

The execution of this order is necessary for the completion of the contract undertaken by this applicant for which the above-mentioned Principal Priority Certificate was issued for the reasons following:  
.....  
.....  
.....  
.....  
.....  
.....

Yours truly,

.....

(Contractor holding Principal Priority Certificate No. B. ....)

Form PC 3. (7) 2-423

rated according to their merits, so that a request from a road that could show that the materials were needed for a purpose that would have a direct effect in enabling it to handle war traffic would be classed as of greater importance than a similar request from a road that could not show so direct a connection with a war emergency.

A railroad which has placed contracts for materials, supplies or equipment, delivery of which has been delayed by inability of the contractor to obtain needed materials or parts, applies for a principal certificate covering its contract, giving the reasons why it is needed and stating that it is able to secure the needed materials, supplies or articles only by being accorded priority. After a principal certificate has been issued the contractor may in turn request a subsidiary certificate covering materials that may be needed by some

sub-contractor or concern that furnishes some of the contractor's supplies necessary for the completion of the principal contract.

For example, a road that has ordered cars, delivery of which is delayed by inability of the car builder to obtain steel, might ask for a principal certificate for the car builder. The latter in turn, if given a principal certificate, might then request a subsidiary certificate to enable the company from which it must obtain some of the car equipment to secure raw materials. Possibly the completion of an order for cars might be delayed by the difficulty of securing some comparatively unimportant item of equipment. If a priority order covering a comparatively small amount of work would enable the cars to be put into service promptly a Class B1 order would undoubtedly be issued, and the fact that actual war orders were given precedence would not necessarily delay the work until the war orders were completed if the B1 order could be worked in with them. On the other hand, if a steel mill had delayed delivery of plates to a car builder in order to complete an urgently needed order for the War Department or the Shipping Board the cars might be delayed. If a railroad needed materials to complete a signal installation and could show that it was handling a large volume of war traffic which would be facilitated by the signal installation, it would have no difficulty in securing a Class B1 order, but if the road were not able to show that the signal installation would directly expedite war traffic or if the equipment was desired for a road which would not be completed for some time a lower rating would undoubtedly be given.

The sub-committee on Materials and Supplies has recently reported that railways generally have been obtaining sufficient metal for their needs, except that there have been some delays, particularly as to rail.

## WASHINGTON CORRESPONDENCE

WASHINGTON, D. C., October 31.

An unmistakable war order pertaining to transportation, one that will curtail if not eliminate industries and operations not considered essential to the winning of the war, was issued by Judge Lovett, the priority agent on October 27.

It requires all railroads, beginning November 1, to deny the use of open top cars, except platform cars and cars in work service, for the transportation of materials and supplies, other than coal, for the construction, maintenance, or repair of public or private highways, roadways, streets or sidewalks; for the construction, repair or maintenance of theatres, or other buildings to be used for amusement purposes; materials and supplies, other than coal, for the manufacture of pleasure vehicles, furniture or musical instruments; or for the transportation of passenger vehicles, furniture or musical instruments.

This limitation upon the use of gondolas, President Wilson has been convinced, is necessary for an augmentation of the coal supply. For the lack of coal to keep her ammunition factories going, Italy is now being forced to relinquish the Austrian territory which she conquered in May and August.

It is estimated that by forbidding the uses named, the coal movement can be increased 600,000 tons a week. The testimony which caused the President to authorize the issuance of the order tended to show that coal production is being kept down by the inability of the railroads to provide more cars, and that that inability resulted from the carelessness of some railroad officers, and from the obstinacy of consignees who, notwithstanding protests, loaded out coal cars which they had emptied instead of allowing them to be returned without delay to the mines.

The order, by its terms, suggests that the open-car com-

modities at present deemed most important are coal, coke, ore, limestone needed in blast furnaces, sugar beets, sugar cane, sorghum and other raw materials for use in the metal, sugar and fertilizer industries, and other commodities necessary for the national defense and security.

While it is called priority order No. 2, it does not follow the form of No. 1. The first order directs that preference be given to lake cargo coal. This one does not say that the railroads shall give preference and priority to coal, coke, etc. On the contrary, it says they "shall deny the use of" gondolas for the purposes indicated. That language was determined upon only after considerable discussion among the transportation men (who really suggested the limitation). Under an order to give preference, it was suggested by those who advocated the "shall deny" form, too much discretion is left with a commercial agent or a yardmaster, who may be anxious to acquire the good will of a big shipper. For illustrative purposes, consider this situation: A manufacturer receives a car of coal. Then he says to the railroad man, "I have a load of paving brick going to Hilltown, ten miles from the mines, and on the direct route to them. I will unload, and load this car before you can get the yard crew to take it away, and I know the bricks will be taken out instantly when it arrives at Hilltown. If you don't let me load them, I'll hold this car 48 hours, and it will not get back to the mines as soon as it will if you allow me to use it for the brick."

The receiver of the coal has a right to hold the car for 48 hours without incurring penalties. Under the terms of the first priority order, the railroad man would have a discretion, perhaps not a legal one, but nevertheless a discretion. Under No. 2, there is no discretion. The railroad "shall deny the use" of open top cars, with the exceptions mentioned, for anything other than the metal, sugar and fertilizer industries and for commodities necessary for the national defense and security.

While the order says "the President has come to the conclusion," etc., the fact is that the transportation men in the Government service are the ones who reached the conclusion and persuaded the President and Dr. Garfield, the Fuel Administrator, to adopt it. Judge Lovett, acting through George W. Kirtley, his executive officer, the members of the Sheaffer committee, and E. H. DeGroot, Jr., and A. G. Gutheim, the commission's division on car service, are the men who devised this plan for so materially increasing the country's coal supply. It is almost a certainty that the order will put a stop to the road-building programs in all the states. Ohio, according to the information reaching Washington, has been using 6,000 cars of road-building materials every week. Another bit of information upon which the car service men worked is that a big automobile manufacturer shipped 60 per cent of his output in coal cars.

The order will be enforced to the letter. If the interdicted industries and operations can survive by using other kinds of cars, they may continue during the war, but not otherwise. Inasmuch as the President's power to grant preferences and priorities is undisputed, it is believed that the method by which he accomplishes the result will not be scrutinized with fault-finding eyes by the courts.

Issuance of the second priority order, as distinguished from the lake cargo coal order; the order for the fueling of various railroads and the diversion of lake cargo coal to any preferred destination during the 24 hours beginning at midnight of October 28; and the appointment of two railroad men, G. N. Snider of the New York Central and Arthur S. Learoyd of the Delaware, Lackawanna & Western, made known in Washington on October 25, indicate, it is suggested, a growing recognition by the powers that be, that fundamentally the winning of the war depends on the full utilization of American railroads. Mr. Snider is to be the

head of the Fuel Administration's transportation department, and Mr. Learoyd is to have charge of the distribution of anthracite coal.

#### ADVANCED RATE PROCEDURE

The Interstate Commerce Commission, on October 27, consolidated the various investigation and suspension cases created by the tariffs filed immediately after the decision in the Fifteen Per Cent case, canceled the hearings therein, and set them down for hearing in connection with the re-opened Fifteen Per Cent case, technically known as Ex Parte No. 57. What, if any, particular meaning is to be attached to this consolidation is not very clear. There have been intimations that the Commission, in re-opening the Fifteen Per Cent case, intended to take the initiative in that matter out of the hands of the Eastern carriers and keep the proceeding under its own control. How accurate an appraisal of what is in the recesses of the minds of commissioners that may be has not been disclosed. George Stuart Patterson suggested the consolidation and postponement of hearings until such time as the carriers might complete more satisfactory tariffs, about sixty days from the time when he was speaking, October 17. There can be no detailed hearing on any of the suspension cases, six in number, on November 5, the day set for the hearing in the re-opened case. Details can be given in only one, a hearing for which was set on November 1. No time for detailed justification has been allowed in the others. The most that can be said is what has already been told the old suspension board, now known as the Fifteenth Section Board, namely, that some of the tariffs in question overcome the objections set forth in the report on Ex Parte No. 57 as to the destruction of market relationships, and that a fair reading of the reports in the big case and the Central Freight Association decision, authorize the others. About the only other showing that can be made is that expenses are rising much faster than revenues; that net earnings are decreasing and the return on property investment is smaller than ever because large additions have been made to capital.

.. .. .



Photo from Underwood & Underwood, N. Y.

Transporting Wounded Men on Light Railway—British Official Photograph from the Western Front

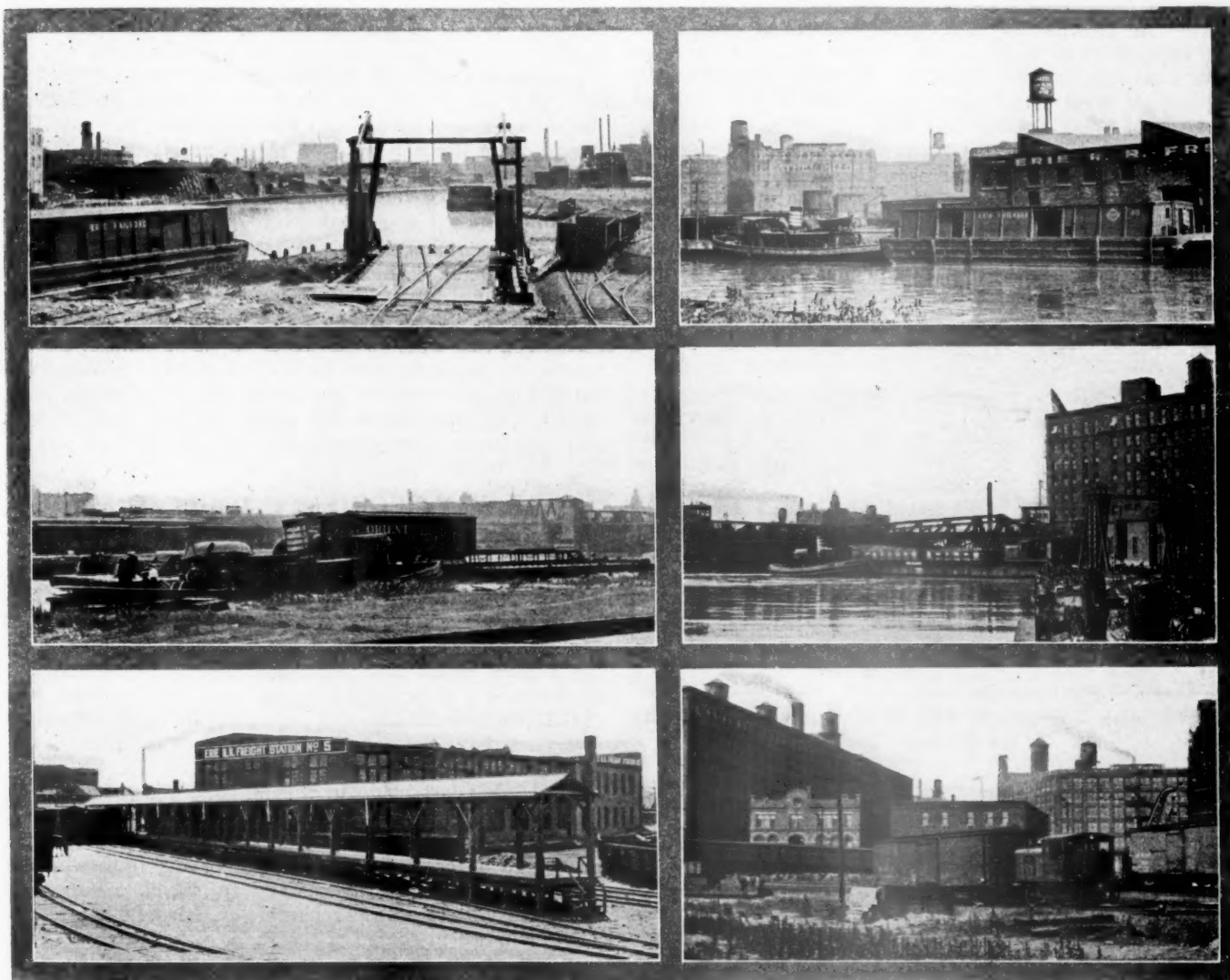


# Erie Barge and Car-Float Service at Chicago

The Completion of a New Freight House Marks the Close of Four Years of Successful River Transportation

**T**HE recent opening of a new freight station on the Chicago river at Webster avenue, constitutes a valuable addition to the Erie's facilities for handling eastern business by barge and car float between their rails and the northern section of Chicago. It is also an indication that the river service inaugurated by the Erie four years ago is increasing in scope and importance. The main freight terminal at Fourteenth and Clark streets was then disadvantageously situated for the solicitation and handling of

Under conditions existing prior to the summer of 1913, it was necessary for the shipper and receiver of l. c. l. freight over the Erie to team to the road's freight house at Fourteenth and Clark streets, on the south side of the city, to the universal freight stations of the Illinois Tunnel Company in the loop district or to stations of terminal roads on the southwest and west sides. An additional disadvantage lay in the fact that six of the universal freight stations handled outbound l. c. l. freight only. All of these stations were at



Float Bridge at Webster Avenue  
Tug and Car Float at Erie Street  
New Webster Avenue Station

Tug and Barge at Erie Street  
Tug Landing Car Float at Float Bridge  
Gasolene Locomotive Working at Erie Street

traffic consigned to and originating in the north and north-west sections of the city. In order to compete more effectively with other roads, it decided to extend its terminal facilities into that field by utilizing the river. The construction of river freight stations and the launching of a barge and car float service was a new venture for a railroad in Chicago, but a steady increase in business ever since the inception of the service has justified the judgment of those who advocated that means of entering this territory.

such a distance from the northern and northwestern sections of the city as to discourage l. c. l. traffic over the Erie. The road was also handicapped in the solicitation of carload traffic, for although freight routed over the Erie could be shipped to or from the north side by way of connections, it had to undergo the delay incident to switching across the city and passing through interchange yards.

The first river freight station, known as Erie street station, was opened at Erie and Kingsbury streets in August,

1913; in the following month a station was opened on a site at Market and Washington streets, known as Market Square station, which had previously been used by the Erie Railroad Lake Line. It was not until May 1, 1915, that the first Webster avenue station was opened. For a time the Erie rented a float bridge at Robey and Twenty-seventh streets, where cars were transferred to and from its rails, but later a float bridge was constructed by the Erie at Eighteenth street, close to its Fourteenth street freight house, shortening the river haul.

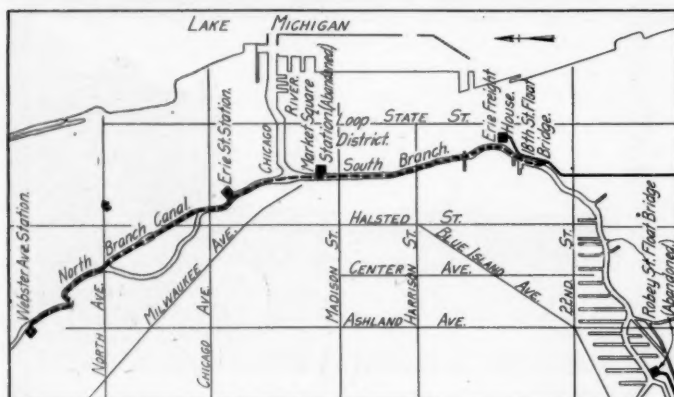
The river service has not only proved attractive to shippers and receivers in the north and northwest sections of Chicago, but has been taken advantage of by industries with dock facilities located on the river. All kinds of all-rail freight, except coal and coke, both in c. l. and l. c. l. lots, are handled at the freight stations, while river industries may ship or receive freight in quantities of 10,000 lb. or more. At present the Erie's river equipment consists of two tugs, four car floats and five barges. Two of the floats have a capacity of four cars each and the two others have a capacity of eight cars. The barges carry from five to six carloads of break bulk freight each, according to the commodities loaded. The tugs operate both day and night.

The Market Square station was abandoned on April 30, 1916, when the lake service was discontinued, so that the Erie has now but two river freight houses. The improvements at Webster avenue, more than compensate for the loss of the station at Market and Washington streets. The new facilities include a brick freight house with a track capacity

livered some time this year, was requisitioned by the government.

The river service has built up a large business for the Erie on the north side of the city, because it has greatly expedited the handling of traffic to and from that territory. There is no longer any incentive for shippers and receivers to favor other roads because of long team hauls through the city to Erie stations, or because of delay to c. l. shipments in switching across the city. In the handling of c. l. freight routed over the Erie fully 48 hours have been saved. Inbound cars are delivered at the river stations on the day of arrival in the city and outbound cars are handled just as quickly. The freight houses have proved especially convenient to certain adjacent industries which formerly had to haul their products considerable distances by team to stations of other roads. Shippers of heavy and bulky products have found the Erie stations especially advantageous. The territory served by the river stations is by no means confined to shippers and consignees in their immediate vicinity, but extends north and northwest to the limits of the city. It is difficult to trace accurately the dividing line between the zones served by the two freight houses, but, speaking roughly, the division may be placed at North avenue, an east-and-west thoroughfare, about a mile and one-half south of the Webster avenue station, and two and a quarter miles north of Erie street station.

The traffic handled on the river includes almost every kind of freight. Among the commodities carried by the barges and car floats for industries with dock facilities are merchandise, cheese, coffee, hides, cocoanuts, beer, canned goods, egg case fillers, sugar, cement, soap, tanners' extract, rubber, bicarbonate of soda and charcoal. Among those handled in carlots at the stations are merchandise, tin plate, caustic soda, hides, matches, paper, leather, wool, barrels, soap, oil, brass, glass, pianos and iron and steel articles.



Map Showing Location of Erie Freight Houses and Route of Tugs

for 17 cars, carload team tracks for 43 cars, paved driveways leading to the freight house and team tracks from both Webster and Elston avenues, and a float bridge by means of which cars can be transferred to and from car floats. A 15-ton pillar crane will be erected later for the handling of heavy freight. The freight house was formerly used by a manufacturing establishment and has been provided with an initial storage space of about 9,000 sq. ft., with room within the walls for 13,000 sq. ft. more on the ground floor and for the construction of a second floor if increased traffic warrants. The new station replaces a small temporary house.

The facilities at Erie and Kingsbury streets, where the larger of the present stations is located, include a freight house with 37,700 sq. ft. of floor space, a float bridge, a team track yard with a capacity of 19 cars, equipped with a 15-ton pillar crane, house tracks with room for 10 cars, and storage tracks for 8 cars. The freight house fronts on the river, permitting the direct transfer of freight to and from the barges and car floats. Two gasoline locomotives capable of handling 500 tons perform the switching service both at Erie street and Webster avenue stations. A third locomotive of this type for reserve power, which was to have been de-

### RAILWAY REGIMENTS' TOBACCO FUND BEGINS TO GROW

The railway supply concerns of the country have begun to respond generously to the request for subscriptions to the Railway Regiments' Tobacco Fund. Up to October 31 fifty-two concerns had subscribed \$10 a month each, making a total which had been subscribed of \$520 a month. In addition a contribution of \$25 has been received from the Barco Manufacturing Company, Chicago. In only a few cases have companies made replies declining to subscribe.

While the start made in raising the fund is gratifying, the amount which has thus far been subscribed is, of course, far short of the total which it is desired to raise. In fact, it is only about one-eighth of the fund which is needed, as the estimated cost of an adequate supply of tobacco for all the railway regiments exceeds \$4,000 a month. The committee in charge of the fund, of which F. A. Poor, president of the P. & M. Company, is chairman, therefore hopes that responses to the request for subscriptions will come in more rapidly and in larger number from now on. As previously announced, checks should be made payable to "John R. Washburn, treasurer," and forwarded to "Samuel O. Dunn, secretary, Railway Regiments' Tobacco Fund, Transportation Building, Chicago."

The first list of subscribers to the fund was published in the *Railway Age Gazette* for October 26, page 753. That list included 26 subscribers. The following list gives the subscriptions received between the time of the preparation of the original list and October 30:

Ajax Rail Anchor Co., Chicago.....	\$10 a month
American Flexible Bolt Co., Pittsburgh, Pa.....	" "
Boss Nut Company, Chicago.....	" "
Buckeye Steel Castings Co., Columbus, Ohio.....	" "
Dilworth, Porter & Co., Pittsburgh, Pa.....	" "
Imperial Appliance Co., Chicago.....	" "



Interstate Iron & Steel Co., Chicago.....	\$10 a month
Independent Pneumatic Tool Co.....	" "
Morden Frog & Crossing Works, Chicago... (to cover 3 months)	30
Mudge & Co., Chicago.....	10 a month
Okonite Co., New York.....	" "
Ohio Injector Co., Chicago.....	" "
Paxton-Mitchell Co., Omaha, Neb.....	" "
Pennsylvania Tank Car Co., Sharon, Pa.....	" "
Pratt & Lambert, Inc., Buffalo.....	" "
Q & C Co., New York.....	" "
Rail Joint Company, New York.....	" "
Railway Materials Company, Chicago.....	" "
Railway Steel-Spring Co., Chicago.....	" "
Roberts & Schaefer Co., Chicago... (to cover 15 months)	150
Wm. Sellers & Co., Philadelphia, Pa.....	10 a month
Spencer, Otis & Co., Chicago.....	" "
Valentine & Co., New York.....	" "
Vapor Car Heating Co., Chicago.....	" "
Vernon Tool Works, Pittsburgh, Pa.....	" "
Whiting Foundry Equipment Co., Harvey, Ill.....	" "

## RAIL FAILURE STATISTICS FOR 1916\*

By M. H. Wickhorst

Engineer of Tests, Rail Committee, American Railway Engineering Association, Chicago.

This report deals with the statistics of rail failures collected for the year ending October 31, 1916, furnished by the railroads of the United States and Canada in response to a circular sent out by the American Railway Association. The information furnished by each railroad showed the number of tons laid of each year's rolling from each mill, the equivalent number of track miles, and the total number of failures that occurred in each year's rolling from the date laid until October 31, 1916.

The failures were divided into four classes, namely, head, web, base and "broken." The reports cover rollings for 1911 and succeeding years and the ages of the rollings would average in the track about the years shown below:

1911 .....	5 years	1914 .....	2 years
1912 .....	4 years	1915 .....	1 year
1913 .....	3 years	1916 .....	Several months

The tonnages represented by the statistics in this report are shown below:

Year rolled	Bessemer	Open-hearth	Total
1911 .....	365,910	810,396	1,176,306
1912 .....	203,702	1,254,960	1,458,662
1913 .....	135,870	1,503,366	1,639,236
1914 .....	63,599	1,026,915	1,090,514
1915 .....	12,212	1,080,361	1,092,573
1916 .....	33,658	749,765	783,423

The equivalent track miles are as follows:

Year rolled	Bessemer	Open-hearth	Total
1911 .....	2,198.87	5,770.54	7,969.41
1912 .....	1,448.22	8,812.71	10,260.93
1913 .....	969.97	10,365.44	11,335.41
1914 .....	452.49	7,052.75	7,505.24
1915 .....	90.29	7,291.00	7,381.29
1916 .....	259.67	5,093.04	5,352.71

It will be noted that in recent years the Bessemer steel has formed only a small part of the rail rolled as covered by the returns in this report. The failures were tabulated with reference particularly to the performance of the rails made by the different mills. Lots of less than 1,000 tons (that is, less than 1,000 tons in any one year's rolling for a railroad) were excluded from the tabulation, as they would unnecessarily extend the tables and not materially change the group totals and averages.

It is interesting to note the comparative performance of Bessemer and open-hearth rails. Figuring the failures per 100 track miles of open-hearth rails as 100 for each of the years 1911, 1912, 1913 and 1914, the relative failures of Bessemer rails, together with the failures per 100 track miles, are shown below:

FAILURES OF OPEN-HEARTH AND BESSEMER COMPARED					
Year rolled	Years service	Failures per 100 track miles		Comparative failures	
		Open-hearth	Bessemer	Open-hearth	Bessemer
1911 .....	5	161.9	214.1	100	132
1912 .....	4	74.2	107.7	100	145
1913 .....	3	43.3	60.1	100	135
1914 .....	2	18.9	32.3	100	171

\*Abstracted from Bulletin No. 199 of the American Railway Engineering Association.

It will be noted that the failures of Bessemer rails per 100 track miles were considerably greater than those of the open-hearth rails. It is probably also true that the open-hearth rails were, in general, in more severe service, so that the actual difference under the same conditions may have been greater.

The figures indicate that the failures of Bessemer rails occur at a considerably higher rate than the failures of open-hearth rails in their early period of service, but as they remain longer in track, the rates of failure become nearer alike.

In order to show more conveniently the relative number of failures from each of the mills and to show the ranking of the mills as regards the failure performance of the rails rolled by them, a table was prepared. Taking the average number of failures per 100 track miles of all the mills in each group (Bessemer and open-hearth) in any year's rolling as 100, the relative number of failures of each of the mills was shown for the years 1911, 1912, 1913 and 1914. It was interesting to note from the tables and diagram that the mills which had the greatest number of failures some years ago and ranked the lowest are showing a tendency to a considerable reduction in the number of failures and ranking well in more recent years.

## COURT TAKES CONTROL OF RATE-MAKING

On March 1, 1916, the Evansville & Indianapolis, running from Terre Haute to Evansville, Ind., 134 miles in length, was placed in the hands of a receiver by Judge A. B. Anderson, of the United States District Court for the District of Indiana. The receiver appointed was William P. Kappes, an attorney of Indianapolis, Ind. The receiver took possession and began to operate the railroad on March 1, 1916. At that date the railroad had no equipment whatever, either engines or cars. Its roadbed was in lamentable condition, being ballasted mainly with dirt, which entailed frequent washouts and large expense for maintenance. Its rails were light; averaging 56½ lbs. to the yard. Its principal bridge, a steel structure across White river, had been carried away by a flood, and the track was temporarily supported on a trestle. There were no funds whatever received by the receiver. Operations were carried on for ten months by renting engines and cars. No net revenue was realized and the receivership ran into debt.

In January, 1917, \$600,000 was borrowed on receiver's certificates and was invested in a partial rehabilitation of the railroad and the acquisition of a small amount of rolling stock. By reason of the great increase in the cost of material and in the wages of employees the savings effected by the rehabilitation were neutralized. The figures of operation demonstrated that in the carriage of coal, which was two-thirds of the traffic of the railroad, there was a continual loss of money, averaging as much as \$13,000 a month and that in the carriage of passengers there was a continual loss averaging \$3,000 a month.

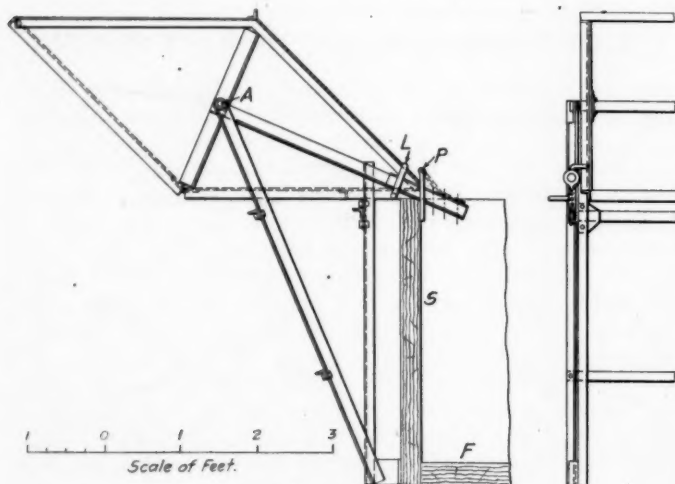
Efforts were made by the receiver to obtain better rates on the carriage of coal by application to the Public Service Commission. These applications were denied by the commission. Thereupon the receiver filed petition in the District Court of the United States setting out the efforts that had been made and the losses that were being incurred and alleging that the two-cent passenger fare law of Indiana was confiscatory of the property of the Evansville & Indianapolis and that the rates enforced by the Public Service Commission were likewise confiscatory. The receiver gave notice not only to all the parties in the case, but to the Public Service Commission of Indiana, the attorney general of the state and the prosecuting attorneys of the counties through which the railroad operated.

The petitions were set down for hearing on October 23 and

on that date were heard by Judge Anderson. An order was entered by the court sustaining the receiver's petition declaring the two-cent fare law of Indiana to be confiscatory, so far as it related to the passenger fares upon the Evansville & Indianapolis, and declaring that the freight rates established by the Public Service Commission of Indiana were confiscatory and invalid so far as they failed to cover the cost of operation, on the E. & I., with a reasonable profit. The order directed the receiver to establish compensatory rates for passenger, freight and switching service, any statute or any order of the commission to the contrary notwithstanding; and in the event that any person should attempt or threaten to bring any action to enforce any penalty on account of said statute or orders of the Public Service Commission of Indiana the receiver was given leave to sue for an injunction.

### THE RAPID LOADER

The "rapid loader," shown in the photographic illustration, is a device for saving the time of teams, or trucks, when hauling coal, gravel and similar material from cars. Two "loaders," holding 30 cu. ft. each, filled by hand shoveling while the wagon or truck is away on its preceding trip, can



Details of Loader

be tipped in a half minute each, so as to fill the wagon and to impose practically no delay on the driver and horses.

The loader is made of steel, and is said to be "foolproof." The picture shows it in its normal position, the position in which it stands when it is being filled. It is held in posi-



The Rapid Loader

tion by the pin, P, shown in the drawing. This drawing represents the loader attached to a coal car with sides 42 in. high. The perspective view shows it on a car considerably higher. Having been emptied, the pan, turned on the pivot,

A (and held in position, while being filled, by the locks, L, one on each side), returns by gravity to the position shown.

This device is made in two sizes: the one most commonly used, No. 2, weighs 340 lb., and holds 30 cu. ft. when level full. To move the loader from one car to another the pan is lifted out from the frame, and the whole is moved in two pieces, no further knocking down being necessary.

This loader is made by the Bonney Supply Company, Livingston Building, Rochester, N. Y. Contractors say that, using this as a time-saver, they release cars a half day sooner than would otherwise be possible, and it is declared that in some cases not over 300 cu. yd. of crushed stone or gravel had to be hauled before the loader was paid for by the saving in time, over the common practice of shoveling gravel directly into wagons. Shovelers can always see where each shovelful of material is landing, and do not waste time by looking over the side of the car to see whether they are throwing it with the right force and direction to have it land in the wagon. There is no waste of material falling on the ground.

These loaders are used in many places in the United States and have been sent also to France and Haiti. A recent shipment went to Atlanta, Ga., for use at one of the new military camps.

### HUNTOON TRUCK BOLSTER

The Joliet Railway Supply Company, Chicago, has placed on the market a new type of truck bolster known as the Huntoon bolster. It is of the built-up type and embodies the same principles of reinforcing the tension member that is used in the tension member of the Huntoon brake beam.

Both the compression and the tension members are of open hearth steel, the compression member being a channel and the tension member a flat bar upset at the ends to retain the full cross sectional area at the rivet holes. The ends of the tension member are provided with shoulders which interlock



Huntoon Built-up Type Bolster

with the web and flanges of the compression member, thus relieving the shearing strain on the rivets. The king post is of malleable iron of heavy cross section. The center plates can be furnished of malleable iron, cast steel or drop forged, as desired. The bolster is adapted to the application of either plain or anti-friction type side bearings.

Tests have demonstrated that this type of construction produces a bolster of great rigidity and strength. Sizes for 30, 40, 50 and 70 ton cars are now being manufactured and the company is prepared to furnish them in any quantities desired.

INDIAN WAR TRAFFIC REGULATIONS.—Under the "Defense of India Act," the Governor General-in-Council has been authorized to give orders for the following purposes: (1) For requiring railways to give special facilities as to the transport of any article or thing which, in his opinion, is capable of utilization in the prosecution of the present war. (2) For enforcing the prompt loading or unloading of cars; and (3) for controlling other trucks and cars, and for controlling other traffic to expedite the transport of such article or thing.



## TRADING WITH THE ENEMY ACT AND ITS APPLICATION\*

By Hon. William C. Redfield

Secretary of Commerce.

We are not engaged in a contest for material things, for money, or for territory, or for power, or influence, or for a place in the sun; in the last analysis, we are engaged in a conflict against hideous evil in the world, evil enthroned in high places, evil which for its own purposes would willingly take you and yours, which has not hesitated upon our own soil to promote sabotage and slaughter, fire and explosion, and which does not reckon at all human values, if by so doing it may be enthroned in power.

\* \* \* \*

This is not merely our war, nor the war of Great Britain, nor the war of France, nor of Italy—it is the war of four-fifths of the human race against a wrong which threatens it all.

\* \* \* \*

Now, commerce is used as a war weapon in two ways. First, it is used to provide the nations associated with us in the war with the means of warfare; and, second, it is used to see that our enemies do not by direction or indirection obtain anything that comes from our shores which we can prevent. There is a third element in it, the element of conservation, which has to do not with economy of money, as I think is too often thought, but with the saving of that of which we have but little, to the use that must be made of it in the war and the using, on the other hand, of that of which we have abundance in its place.

\* \* \* \*

The principle which lies behind the restriction of exports is the principle of conservation; that our industry shall be so controlled as regards exports that after our own needs are satisfied, what we sell shall be used to support our associates, and what we have left over shall go freely to places where it is safe to have it go and to persons who use it wisely.

That is the simple principle that lies behind the whole question of the restriction of exports.

Now, the restriction of imports is not our own; it is imposed upon us, but we are the beneficiaries. At the bottom of it lies the same reasoning precisely.

\* \* \* \*

It had to be general in order to be specific. It is not meant to be, it is not at all likely to be exercised in a general way; it means simply that a body—in this case the War Trades Board—shall be authorized to issue licenses to import prohibited products, and shall import them under such restrictions as that they shall be free for our use, but not free for misuse in the sense of being sold to the enemies of the common cause.

\* \* \* \*

Now, those are the principles which underlie—I think they are very simple, very clear—the restrictions of exports on our part and the restriction of imports of the prohibited articles from foreign countries. They both mean the concentration of the world's power against the evil we are fighting.

\* \* \* \*

The restriction of the act will exist whether there is any act or not. It is and has long been the law of nations that in time of war all communication with the enemy of all kinds is prohibited. It didn't need this act to make it impropriety, an act of wrong, to sell goods to the German in Germany, or to ship goods to South America, knowing that by that means they would reach Germany, or reach anybody so as to aid

Germany—that is just as strongly forbidden if this act were repealed to-morrow. The prohibitions of the act are not new; they are simply clearly stated and made plain by the language of the law—but they existed before.

The law, then, provides a clarification of these facts making it perfectly plain what trading is, defining it, defining very clearly with whom trading is forbidden; that is to say, defining enemy and defining ally of enemy; but it does not make new law when it does that; it merely states what was the law before.

Then it proceeds to provide a system of licenses whereby anything which is unlawful in the act or without it, of that character can be legalized by a license.

That is the whole and center and substance of the "Trading with the Enemy Act," the restating plainly and definitely of existing law and the providing of licenses to do, under proper circumstances, anything thereby declared to be lawful.

## A NOVEL FORM OF CAR EFFICIENCY CIRCULAR

To concentrate attention on the importance of the prompt release and movement of cars, T. D. Simmons, car distributor on the North Carolina division of the Seaboard Air Line at Hamlet, N. C., has been getting out car efficiency circulars weekly for the past eight months. In addition, car detention statements showing the delays to all cars at all stations have been sent to each agent on the division during the last five months. To make these circulars more readable and attractive and thereby secure greater attention for them, recent copies have been issued in newspaper form.

This paper, which is called The Weekly Car News and which has for its aim, "make one car do the work heretofore requiring two," is issued in mimeographed form and contains editorials, the car detention statement, a summarized statement of the average detention, comments regarding delayed car conditions and car service "advertisements."

The following is typical of the editorials: "During the past week we have received a considerable number of penalty orders from the small shippers on the division. This practice must be discouraged. Agents should point out to these shippers the serious situation we are in, . . . and endeavor to show them the unreasonableness of the action in placing penalty orders. State to them we will be compelled to take steps to protect the company in such cases, especially where such shippers as those at — order four box cars for government lumber and one for commercial shipment, filing a penalty order for the commercial car, which will have to be furnished first. Any firm with this disposition deserves no consideration and we expect to handle this case with the Norfolk office for further handling with the National Defense Committee."

News items pertinent to the car distribution problem, such as the following, are also published:

### A NEW AGENT

Mr. C. C. Birmingham is acting agent at Osborne. The former agent was one who would not order cars for shippers or read our circulars.

Equally to the point are want-ad advertisements such as the following:

WANTED: StL&SF 121548, SAL 45370 and CC&O 2661 loaded with cross ties for the roadmaster, delayed at Hamlet 21 days. These cars wanted for revenue service.

TO EXCHANGE: Slow handling of cars at Wilmington for better car handling.

These news letters have served to emphasize to the agents the importance of the problem of unloading cars promptly and have aided greatly in improving the mileage performances, the average miles made per car per day on this division now being about 49 as compared with 27.1 a year ago.

\*Extracts from an address delivered before the New York Editorial Conference, Tuesday, October 13, 1917, at the Automobile Club of America.

## General News Department

The annual meeting of the General Managers' Association of Texas will be held at the Adolphus hotel, Dallas, Tex., on December 6.

The Post Office Department announces that the profits of the department for the fiscal year ending on June 30 last amounted to more than \$9,000,000; and that sum has been paid in to the Treasury Department as a contribution to the general fund.

The machine shop and roundhouse of the Chicago & Eastern Illinois at Salem, Ill., were destroyed by fire on the morning of October 25. The explosion of a five gallon can of gasoline is believed to have started the fire and the loss is estimated at \$200,000.

The Interborough Rapid Transit Company, operating subway and elevated railroads in New York City, announces that to all employees who receive less than \$150 a month, bonuses of \$6 a month will be paid. This is an advance of the bonus from \$3 to \$6, the smaller sum having been paid since August 1 last.

In the United States District Court at New York City last week indictments charging fifty-six unlawful acts in connection with concessions in demurrage on boats were found against the Lehigh Valley Railroad, F. E. Signer, general eastern freight agent of that road, and Charles Schaefer, of New York, a shipper.

The Baldwin Locomotive Works, in the week ending October 20 turned out 72 locomotives. This is at the rate of more than 3,600 a year, compared with 1,989 for the year 1916 and 2,666 in 1906, which was the previous record year. The company is employing an army of 20,000 men and work on government orders engages every department.

The station men, freight clerks, and other classes of employees on the Boston & Maine, who have been threatening a strike for several weeks, finally agreed, on October 25, to refer their claims to arbitration; and Henry B. Endicott, of the Massachusetts State Council on Public Safety, was agreed to both by the railroad company and the committee of employees as the first arbitrator. Each side will select one other arbitrator.

The Lehigh Valley has created the position of fire marshal. Announcement of the appointment of John M. Julian to the position has been made by H. C. Kurtz, chief of the insurance bureau. Mr. Julian has managed the fire-fighting forces of the New York division. His new duties will give him authority over the fire-fighting facilities and conditions affecting fire hazards for the whole system. His office will be in New York.

The New York & Pennsylvania Railroad, 60 miles long, from Canisteo, N. Y., near Hornell, southwestward to Genesee, Pa., and thence westward to Ceres, N. Y., a length of about 57 miles, announces that business will be suspended December 1. The line serves a number of villages which will be wholly deprived of railroad communication. The road has been operating at a loss for the last two years and in recent months has been especially handicapped by lack of men and shortage of coal.

A. H. Plant, Washington, D. C., chairman of the Accounting Officers' Association Committee, announces that the Internal Revenue Department has reconsidered the tax on excess baggage, and holds that the rate of tax to be applied on amounts paid for excess baggage shall be on basis of the tax on persons, namely, eight per cent of the amount paid, instead of on basis of the tax on packages by express. The tax on single trip one way and round trip tickets applies on all rates of thirty-six cents or more.

The Canadian Government has issued an order describing in detail the authority and powers granted to the Fuel Controller, to go into effect November 1. All importers of and dealers in coal must be licensed; commissions and profits are strictly limited and hoarding of coal is forbidden. Prices will be adjusted to stocks on hand, every two weeks; and, except in the summer, no consumer shall have on hand more than enough coal to last him for two months. In case of emergency the fuel controller may

make requisition for coal on any consumer who has more than he needs.

The Philadelphia & Reading, the Central of New Jersey, the Wabash, the Copper Range and other railroads have issued notices to the effect that annual and other season passes which, according to their terms, will expire on December 31, 1917, have been extended to December 31, 1918. Under the regulations of the Interstate Commerce Commission, this extension of time may be made without making endorsement on the passes, a general notice, issued by the road and filed with the commission, being considered sufficient.

The Chicago, Rock Island & Pacific, following an arbitration, has advanced the pay of telegraphers and has made reductions in the workday. The agreement provides for overtime payments for Sunday work, for two weeks' vacation for employees of two years' standing, and other privileges. The advances will add about 12 per cent to the company's payrolls for telegraphers. The Wabash has made an increase of ten per cent in the wages of about 600 telegraphers. Members of the Order of Railroad Telegraphers on the Missouri Pacific have presented a complaint concerning the smallness of the commissions which they receive from Wells-Fargo Express, asking that the present percentages, of six to ten, be increased to a uniform commission of 15 per cent.

The Chamber of Commerce of the United States, reporting on its referendum concerning proposed new railroad legislation, announces an overwhelming vote in favor of laws for Federal regulation of the issuance of railroad securities, and for the other recommendations of the Wheeler committee. For Federal regulation of the issuance of railroad securities the vote was 1,112 in favor and only 27 opposed. For a general railroad incorporation law, under which all railroad carriers subject to the jurisdiction of the Interstate Commerce Commission may organize, the vote was 1,111 to 25. To make such a law compulsory the vote was 1,080 to 49. On the recommendation that the Interstate Commerce Commission be given authority by statute to regulate intrastate rates when those rates affect interstate commerce the vote was 1,054 to 66.

The Illinois State Civil Service Commission announces that it will hold an examination to provide an eligible list for the position of railroad engineer for the Illinois Public Utilities Commission. There is one position of this kind to be filled at the present time at Springfield, salary \$250 to \$333.33 a month. The duties of the position will be to take charge of the investigation of railroad accidents, the examination of dangerous crossings, the inspection for approval of interlocking plants and signal circuits, the investigation of railroad service complaints, and the preparation of orders in connection with railroads. The position is open only to male citizens of the United States over 25 years of age, with an education equivalent to high school graduation, with preferably higher engineering training and experience in location, construction and maintenance of railroads and other engineering work. Applications must be on file in Springfield, Ill., before November 22, and questions covering training and experience will be mailed to all applicants, together with instructions for sending the replies to the commission on November 24.

### Southern Pacific in New San Francisco Office Building

The Southern Pacific is now occupying its new \$2,000,000 office building at 65 Market street, San Francisco. The 2,500 employees moved from the Flood building with all equipment, records and paraphernalia without the loss of any time in any department. The new building is of steel, brick and concrete, equipped throughout with automatic sprinklers and pneumatic mailing tubes. Store room is being rented on the first floor and 66 offices on the second. Otherwise, the Southern Pacific's general offices occupy the entire structure.



### Better Loading Saves 6,402 Cars in One Month

W. R. Scott, vice-president and general manager of the Southern Pacific, Pacific system, advises that as a result of the car-loading competition in which the agents of the company are participating, 6,402 cars were saved during the month of July, 1917, as compared with the loading in July of last year. Commodities in which the greatest saving of cars is shown follow: Barley, 424 cars; lumber, 509 cars; salt, 40 cars; merchandise, 1,626 cars; rice, 94 cars; brick, 21 cars; canned goods, 96 cars; mill stuffs, 109 cars; perishables, 929 cars; corn and oats, 28 cars; sugar, 88 cars; paper, 78 cars; cement and plaster, 159 cars; miscellaneous, 2,191 cars.

### St. Paul Rushes New Electrification

The Chicago, Milwaukee & St. Paul has announced that the contract for locomotives and substation equipment for its Cascade Mountain electrification from Othello, Wash., to Tacoma and Seattle has been divided between the General Electric Company and the Westinghouse Electric & Manufacturing Co. It has been decided to rush this electrification because of the saving in fuel which it will effect. The electric power will be generated by waterfalls in the Cascade mountains, so that thousands of barrels of fuel oil will be saved annually after electric operation starts. The section to be electrified is 211 miles long; this, with the 440 miles already electrically operated over the Bitter Root, Rocky and Belt mountains, between Avery, Idaho, and Harlowton, Mont., will make a total of 651 miles.

### Economy of the Lucin Cut-Off

An officer of the Southern Pacific, discussing the savings effected by the line across Great Salt Lake, Utah, built in 1902-1904, reducing the length of the railroad and cutting out steep grades and sharp curves, says that 110 million tons have passed over the cut-off since its completion and that in terms of average car loading this would take about four million cars, making a continuous train 37,000 miles long, or enough to reach one and one-half times around the earth. Had this freight been hauled over the old line it would have necessitated the running of 172 million additional car miles and additional work equivalent to lifting a million car loads a mile in the air. The number of train movements a day is 30 less than it would be if the old trains-load limits were now in force, making an enormous saving in fuel.

### Car Distribution Orders

To get empty freight cars into the districts where they are most needed, the Railroads' War Board, acting through the Commission on Car Service, has moved 156,850 empty cars from one railroad to another, irrespective of ownership, since May 1. The orders for these cars since September 1 number 8,905.

The lines to which empties were sent, between October 1 and October 24, were: New York Central, 1,000 cars; Louisville & Nashville, 1,100; Canadian Pacific, 1,000; San Antonio & Aransas Pass, 150; Gulf Coast Lines, 310; Louisiana & Arkansas, 68; Louisiana Railway & Navigation Company, 17; Grand Trunk, 500; Norfolk Southern, 550; Atlantic Coast Line, 1,500; Southern Railway, 260; St. Louis Southwestern, 400; Chicago, Terre Haute & S. E., 200; Mobile & Ohio, 300; Texas & Pacific, 100; Seaboard Air Line, 300; El Paso & S. W., 200; Pittsburgh & Lake Erie, 500; Meridian & Memphis, 150; Tennessee Central, 100; Red River & Gulf, 100; and Sunset Central, 100.

### Howard Elliott on Government Ownership

"The putting all the railroads in the country under this so-called War Board is of interest in another way than simply in its aspect of giving a higher efficiency for the use of the people of the United States," said Howard Elliott, of the Railroad's War Board, in a recent interview. "Some say that the putting together of the railroads the way we have this year is an argument in favor of government ownership. I do not agree with that. I think it means that the splendid initiative of the American business man, that has built up this great transportation system that today is doing 20 to 25 per cent more than it ever did before, even under the complicated conditions that confront us—it means that the initiative of the American business man, if not too much fettered by small and nagging restrictions, can do more for the expansion of American business and the expansion

of the country than we could possibly obtain under government ownership.

"I say this because that is one of the great problems that very likely will develop out of this war, and those who depend on a successful transportation system are the men who will have to help decide that great question by such views as Congress gets from its constituents all over the United States."

### Railroads Take \$77,810,000 of Liberty Bonds

During the past week additional subscriptions to the Second Liberty Loan have been recorded, bringing the total of \$57,470,000 noted in last week's issue of the *Railway Age Gazette* up to \$77,810,000. The new subscriptions reported are as follows:

Atchison, Topeka & Santa Fe (additional).....	\$2,000,000
Delaware, Lackawanna & Western (additional)....	1,000,000
Kansas City Southern .....	500,000
Long Island .....	500,000
Louisville & Nashville.....	6,000,000
Northern Pacific (additional).....	5,000,000
Panama Railroad .....	30,000
Pennsylvania (additional) .....	5,000,000
St. Louis-San Francisco.....	300,000
Texas & New Orleans.....	10,000

Besides the subscriptions of the companies, the Railroads' War Board estimates that the railroad employees of this country have taken more than \$50,000,000 worth of the Second Liberty bond issue. For the first bond issue 241,280 railroad employees subscribed an aggregate of \$20,027,966.

### Disastrous Fire at Baltimore

In a conflagration, believed to have been of incendiary origin, which started on the evening of October 29, Piers 8 and 9 of the extensive terminal plant of the Baltimore & Ohio Railroad at Locust Point, on the south side of Baltimore Harbor, were destroyed together with freight and other property valued at \$4,000,000 or more.

Piers 8 and 9 were stored with great quantities of munitions and supplies. Fifteen of the crew of a British steamer lying at the pier leaped overboard, and it is feared that some of them were drowned. The British steamer *Kerry Range* was destroyed. The fire started in several places simultaneously, and there were six distinct explosions. A. W. Thompson, vice-president of the Baltimore & Ohio, said:

"The destruction of Piers 8 and 9 will not stop our business at Locust Point. We practically have lost only one-half of Pier No. 8 and the new Pier No. 6, which is completed, will more than offset the loss of Pier No. 9. We have arranged to put up temporary buildings at various places in the terminal to handle the business. The city has kindly offered to help us out with the loan of a pier, as has also the Merchants & Miners Transportation Company. Pier No. 8 will be rebuilt immediately. The material was ordered by telegraph before daylight. There are about 1,500 carloads of freight in transit to Baltimore now for export which we have been handling on those two piers. The Furness-Withy Company has been doing a very large business here also. Reports from our police department indicate beyond question of doubt that the fire was of incendiary origin, as there were five explosions at one time."

### Preparedness on the New York Central

Alfred H. Smith, president of the New York Central Lines, has issued a statement showing the immense expenditures of those roads for cars and locomotives during the three years and two months since the war began. The total for locomotives, freight cars and passenger coaches is \$84,324,736; and this equipment at the prices prevailing today would cost \$193,028,610, or an increase of 128.91 per cent!

Thus, by prompt, heavy buying when war broke out, and in early preparation against the present existing dire combination of extraordinary demands for freight service, high prices, and shortage of materials and labor the Central system "has gained an equity of a cool \$100,000,000." Moreover, the gain to the public service in supplying the nation's necessities under war stress, inasmuch as delivery of railroad equipment in America now is impossible at any price, cannot be reckoned in dollars. These humble freight cars and locomotives literally have become almost priceless. About 1,000 locomotives are being sent across the sea to provide for American armies at the front. In freight cars, our government's orders for the month of August alone were 10,866.

Russia is seeking 30,000 to 40,000 freight cars in the United States, in addition to 10,000 in Canada. Railroads and other private buyers must wait indefinitely.

Of freight cars the New York Central bought in the three years 38,052 for the sum of \$53,762,036, or an average of \$1,412.85 per car. The same cars today would cost \$133,839,810, an average of \$3,519.92 per car. The companies bought 734 engines for \$23,768,500, or an average of \$32,383.15 per locomotive. The same locomotives would cost today \$46,927,000, an average of \$63,933.51 each.

Passenger coaches bought numbered 445, costing \$6,794,200, an average of \$15,267.87 per coach. The same cars would now cost \$12,261,600, an average of \$27,544.16. The last of the 38,000 freight cars are just now being delivered. Only about one-half of the 734 locomotives have been delivered, and the remainder will be delayed several months longer through the pre-empting of the manufacturing space for Government necessities.

#### Railway Revenues and Expenses

The net operating income of the railways of the United States for July, 1917, was less than that for July, 1916, by \$3 per mile, or 0.7 per cent, according to the monthly bulletin of the Bureau of Railway Economics.

Total operating revenues, \$348,437,306, exceeded those for July, 1916, by \$45,205,299. Operating expenses, \$237,821,305, were greater by \$42,216,035. Net operating revenue, \$110,616,001, increased \$2,989,264. Taxes, \$16,286,382 increased by \$3,386,523. Net operating income was \$94,291,180, which is a decrease of \$392,818.

If spread over the mileage represented, operating revenues

increased 19.1 per cent; taxes increased 47.6 per cent. Operating income per mile increased 14.0 per cent.

For the Western railways, operating revenues per mile exceeded those for July, 1916, by 12.5 per cent; operating expenses rose 17.3 per cent; net operating revenue increased 4.7 per cent; taxes increased 24.5 per cent. Operating income per mile increased 1.9 per cent.

The seven months of the current calendar year, compared with the corresponding period of the preceding year, show changes per mile of line as follows: Operating revenues increased 12.0 per cent, operating expenses increased 18.2 per cent, net operating revenue decreased 0.8 per cent, taxes increased 17.7 per cent, while operating income decreased 3.6 per cent.

Operating income per mile decreased 17.6 per cent in the East, increased 3.9 per cent in the South, and increased 9.5 per cent in the West.

July net operating income per mile was 0.7 per cent less in 1917 than in 1916, 23.8 per cent greater than in 1915, 40.2 per cent greater than in 1914, and 36.7 per cent greater than in 1913.

The Interstate Commerce Commission has also given out the table below covering returns for August and for eight months.

#### Fire Prevention a Patriotic Duty

Resolutions adopted at the annual meeting of the Railway Fire Protection Association at St. Louis, Mo., on October 2, point out that the responsibility of keeping the Allies stocked with supplies and food rests upon the United States, and that while a maximum output of American productive forces is important,

#### OPERATING REVENUES, EXPENSES AND INCOME OF LARGE ROADS

Item	UNITED STATES		EASTERN DISTRICT*		SOUTHERN DISTRICT		WESTERN DISTRICT†	
	1917	1916	1917	1916	1917	1916	1917	1916
MONTH OF AUGUST								
Average number of miles operated..	230,812.53	230,414.18	59,007.58	59,219.92	42,767.29	42,671.87	129,037.66	128,522.39
Railway operating revenues.....	\$365,055,298	\$326,950,719	\$167,325,547	\$148,201,682	\$52,214,155	\$43,914,590	\$145,515,596	\$134,834,447
Railway operating expenses.....	246,128,383	203,307,968	117,068,969	95,103,342	36,066,748	28,850,049	92,992,666	79,354,577
Net revenue from railway operations	118,926,915	123,642,751	50,256,578	53,098,340	16,147,407	15,064,541	52,522,930	55,479,870
Railway operating income.....	101,884,981	109,869,815	44,148,593	47,733,296	13,110,281	13,209,883	44,626,107	48,926,638
Revenues per mile.....	1,581	1,419	2,836	2,503	1,221	1,029	1,128	1,049
Expenses per mile.....	1,066	882	1,984	1,606	843	676	721	617
Net revenue per mile.....	515	537	852	897	378	353	407	432
Income per mile.....	441	477	748	806	307	310	346	381
EIGHT MONTHS ENDED WITH AUGUST								
Item	UNITED STATES		EASTERN DISTRICT*		SOUTHERN DISTRICT		WESTERN DISTRICT†	
	1917	1916	1917	1916	1917	1916	1917	1916
Average number of miles operated..	230,826.83	230,155.82	59,198.27	59,189.92	42,763.97	42,570.74	128,864.59	128,398.16
Railway operating revenues.....	\$2,610,242,488	\$2,325,578,590	\$1,179,770,720	\$1,073,559,264	\$388,817,240	\$336,217,799	\$1,041,654,528	\$915,801,527
Railway operating expenses.....	1,836,880,123	1,544,709,373	875,484,472	726,947,399	266,043,956	222,405,190	695,351,695	595,366,784
Net revenue from railway operations	773,362,366	780,869,217	304,286,248	346,611,865	122,773,284	113,812,609	346,302,833	320,444,743
Railway operating income.....	648,836,375	877,583,608	256,212,320	304,730,764	102,907,294	99,196,852	289,716,761	273,655,992
Revenues per mile.....	11,308	10,104	19,929	18,138	9,092	7,898	8,083	7,133
Expenses per mile.....	7,958	6,711	14,789	12,282	6,221	5,225	5,396	4,637
Net revenue per mile.....	3,350	3,393	5,140	5,856	2,871	2,673	2,687	2,496
Income per mile.....	2,811	2,944	4,328	5,148	2,406	2,330	2,248	2,136

\* August returns wanting for one company with July operating revenues of \$159,631.

† August returns wanting for one company with July operating revenues of \$96,039.

averaged \$1,507 per mile, an increase over July, 1916, of 14.6 per cent; operating expenses per mile, \$1,029, were greater by 21.3 per cent; net operating revenue per mile, \$478, shows an increase of 2.5 per cent; while net operating income per mile, \$408, decreased 0.7 per cent. Taxes per mile rose 25.9 per cent.

This summary covers 231,174 miles of operated line, or about 90 per cent of the steam railway mileage of the United States.

For the Eastern railways, operating revenues per mile were greater than those for July, 1916, by 14.0 per cent; operating expenses rose 23.4 per cent; net operating revenue decreased 3.5 per cent; taxes increased 20.2 per cent. Operating income per mile decreased 6.3 per cent.

For the railways of the Southern district, operating revenues per mile exceeded those for July, 1916, by 24.0 per cent; operating expenses rose 26.2 per cent; net operating revenue

the rigid conservation of existing materials and foodstuffs deserves like attention. The resolutions contain the following practical suggestions as to the ways and means of further safeguarding freight and other property:

1. Such additional time, thought and money should be spent in the protection of property as may bring about a more positive conservation of property and resources.
2. An ever-increasing patrolling and watchmen's service should be maintained by active, intelligent and carefully instructed men, such forces to be on duty at all important properties and terminals at all times.
3. Superintendents, foremen and agents should give close personal attention and supervision to the condition of all fire apparatus, water supplies and general housekeeping conditions. Responsibility should be placed for such matters and instructions carefully carried out. Personal tours of the property to look into these matters are desirable on the part of those in charge.
4. All fire equipment should be kept ready for instant use, well maintained in all particulars and plentifully supplied, its condition watched and



to be replaced or supplemented promptly when necessary. Defects should be immediately detected and remedied.

5. Fire brigades and organizations should be carefully instructed and regularly drilled and there should be no relaxation in any way in reducing hazards or the ordinary liability for fires.

Copies of these resolutions have been sent to the chief executive officers of all the railroads in the United States and Canada.

#### Congressman Adamson Condemns Government Ownership

"What do we want of government ownership of railroads when we have something far better in this country right now?" This was the reply of William C. Adamson, author of the Adamson "eight-hour" law, when questioned in a recent interview at Denver, Col. "Government ownership of railways is not only a fallacy, but is entirely without excuse for having a champion in the United States at this time," the congressman said. He has been on the house committee on interstate and foreign commerce for 21 years, for the past seven having being its chairman, and has had a leading hand in some of the nation's most important legislation during this time.

"When we faced this war there was at once talk of the government taking over the railroads. I thought the government was too busy preparing for the greatest war the world ever dreamed of to stop to wrestle with the herculean task of taking over the most enormous and complicated network of railroads on any continent on the globe. And, besides, it would have cost billions of dollars. This government knows nothing of operating railroads, so I suggested that we make the President of the United States the traffic agent of all the railroads in this country, and the President agreed with me.

"Then we passed a clause in the war bill which provided for preferential shipments—that is, government business was to move first. The result was that millions of tons of military equipment, hundreds of thousands of soldiers and all sorts of supplies have moved on schedule time during the last seven months and without a hitch. No country, even where they have government-owned railroads, ever duplicated this feat. England had an enormous task to move men and munitions, but we saw not the slightest delay or confusion. We told the railroads what to do and they co-operated, not only with splendid spirit but with an efficiency that demanded the admiration of the world. The government got just what it wanted and the railroad chiefs—men whose life work has been railroading—were there to carry out our wishes."

#### Chicago Switchmen Threaten Another Strike

Representatives of switchmen belonging to the Brotherhood of Railroad Trainmen employed by nineteen railroads entering Chicago recently gave out the following statement: "We hereby earnestly express the belief that the lowest minimum living wage with which a yardman can under existing conditions properly and decently support his family is \$5 per day, and that the present differentials between day and night rates for helpers and foremen should be maintained."

Railroad officers are expecting demands from the brotherhood at any time. The wage scale, which, it is said, the B. R. T. will ask is as follows: Day helpers, \$5 a day; night helpers, \$5.20; day foremen, \$5.30; night foremen, \$5.50. About 2,500 switchmen employed on the nineteen roads belong to the B. R. T., and about 1,300 are non-union. Should the increases be granted by the nineteen roads in question the raise would also probably have to be given to switchmen on all roads in the Chicago switching district, numbering about 7,000. The last time the switchmen presented demands to the Chicago carriers a strike resulted which lasted from July 28 until July 30, when the intervention of officers of the other three railway brotherhoods brought about a settlement.

On Wednesday, October 31, the Switchmen's Union, S. E. Heberlin, president, which represents a large percentage of the yardmen in and around Chicago, formulated a request for large increases in the pay of switchmen, switchtenders and towermen, and asked the railroads for a conference on December 3. They ask for time-and-one-half for all work beyond eight hours a day.

#### National Waterways Congress

S. A. Thompson, Washington, D. C., secretary of the National Rivers & Harbors Congress, announces that the fourteenth annual convention of the congress is to be held in Washington, December 5, 6 and 7.

#### The Freight Claim Association

W. P. Paylor, Richmond, Va., secretary of the Freight Claim Association, announces that a conference is to be held at the Vanderbilt Hotel, New York City, November 27, to consider proposed changes in the forms, adopted last year, which have been prescribed for use in making claims on transportation companies for concealed loss and damage. Committees representing the freight claim association, and prominent commercial interests, will confer in the forenoon and take up criticisms of the present forms growing out of the experiences of the last year; and in the afternoon there will be a more general conference, to which shippers' representatives from all over the country have been invited.

#### MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

- AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 165 Broadway, New York City.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, 455 Grand Central Station, Chicago.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D., L. & W., Hoboken, N. J.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, Chicago, Ill.
- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—Fred C. J. Dell, 165 Broadway, New York.
- AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPEFITTERS' ASSOCIATION.—W. E. Jones, C. & N. W., 3814 Fulton St., Chicago. Convention for 1917 postponed.
- AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, general secretary, 75 Church St., New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next annual meeting, October, 1918, New York.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next annual meeting, March 20-22, 1918, Chicago, Ill.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—Owen D. Kinsey, Illinois Central, Chicago.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, Supt. Timber Preservation, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January, 1918, Chicago.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, Rooms 1116-8 Woodward Bldg., Washington, D. C. Next annual meeting, St. Louis, May, 1918.
- ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Semi-annual meeting with Master Car Builders' Association.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, Terminal Station, Central of New Jersey, Jersey City, N. J.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—W. L. Connelly, Superintendent of Telegraph, Indiana Harbor Belt, Gibson, Ind.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—Tom Lehon, The Lehon Company, Chicago. Meetings with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—W. R. McMunn, New York Central, Albany, N. Y.
- CINCINNATI RAILWAY CLUB.—H. Boutet, Chief Interchange Inspector, Cin'ti Rys., 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 568 Union Arcade Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.
- FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Traffic Manager, R. F. & P., Richmond, Va.

- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. G. Crawford, C. B. & Q. R. R., 702 E. 51st St., Chicago. Next convention, May, 1918, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1126 W. Broadway, Winona, Minn.
- INVESTMENT BANKERS' ASSOCIATION OF AMERICA.—Frederick R. Fenton, 11 W. Monroe St., Chicago. Next annual convention, November 12-14, Hotel Belvedere, Baltimore, Md.
- MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—F. W. Hager, Fort Worth & Denver City, Fort Worth, Tex. Next convention, October 15-17, 1918, Chicago.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.
- MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Next annual convention, June, 1918, Atlantic City, N. J.
- NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS.—Jas. B. Walker, 120 Broadway, New York City.
- NATIONAL RAILWAY AFFILIANCES ASSOCIATION.—C. W. Kelly, 149 Peoples Gas Bldg., Chicago. Annual exhibition, March 18-21, 1918, Coliseum and Annex, Chicago.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—Geo. A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.
- PACIFIC RAILWAY CLUB.—W. S. Wollner, Assistant to Chief Engineer, Northwestern Pacific R. R., San Francisco, Cal.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York.
- RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Pittsburgh Commercial Club Rooms, Colonial-Annex Hotel, Pittsburgh.
- RAILWAY DEVELOPMENT ASSOCIATION.—D. C. Welty, Commissioner of Agriculture, St. L., Iron Mt. & So., 1047 Railway Exchange Bldg., St. Louis. Next annual convention, May, 1918, Houston, Tex.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1063 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.
- RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Office of the President's Assistant, Seaboard Air Line, Norfolk, Va.
- RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, Assistant Engineer, C. & O., Richmond, Va.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Myers Bldg., Bethlehem, Pa.
- RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, N. Y. C. R. R., Box C, Collinwood, Ohio.
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders' and Master Mechanics' Association.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.
- RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Club has been suspended until after the war.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W., Sterling, Ill. Next annual convention, September 17-19, 1918, Auditorium Hotel, Chicago.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SALT LAKE TRANSPORTATION CLUB.—R. E. Rowland, David Keith Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—L. W. Cox, N. & W., Philadelphia, Pa.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. R. R., Atlanta, Ga.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.—C. B. Signer, La Salle Hotel, Chicago.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next annual convention, June 18, 1918, Grand Rapids, Mich.
- TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Gen'l Ag't, Erie R. R., 1924 Oliver Bldg., Pittsburgh, Pa. Meetings bi-monthly, Pittsburgh.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. R. R., Cleveland, Ohio.
- UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, 1111 Newhouse Bldg., Salt Lake City, Utah. Regular meetings, 3d Friday in month, except July and August, Salt Lake City.
- WESTERN ASSOCIATION OF SHORT LINE RAILROADS.—Clarence M. Oddie, Mills Bldg., San Francisco.
- WESTERN CANADA RAILWAY CLUB.—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.
- WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, Secretary, 1735 Monadnock Block, Chicago, Ill. Regular meeting, first Monday in month, except January, July and August. Extra meetings generally on other Monday evenings except in July and August.

## Traffic News

Morgan's Steamship Line has again been obliged to place an embargo on northbound freight shipments from Galveston.

The National Industrial Traffic League will hold its annual meeting at the Waldorf Astoria hotel, New York, on November 15 and 16.

The Minnesota Railroad and Warehouse Commission held a hearing at St. Paul, Minn., on October 31, on the application of the railroads for changes in the carload minimum weights in intrastate tariffs to make them conform to the interstate minimums.

The experimental use of large motor trucks in the parcel post service, designed to facilitate the transportation of food supplies direct from farmers to city consumers, which was provided for in the last post office appropriation bill, will first be put in operation between Washington, D. C., and Richmond, Va.

At the meeting of the Traffic Club of New York on October 30, T. C. Powell, vice-president of the Southern Railway, delivered an address on "Scientific Marketing." The report of a special committee appointed to investigate pier congestion and delays to vehicles receiving and delivering freight was also discussed.

The Pennsylvania, like most other roads, has posted notices announcing that the internal revenue tax is to be collected on tickets and freight bills after November 1; and passengers are called upon to apply at the ticket offices earlier than has been customary, because of the extra work which the ticket agents will have to do in collecting the tax and validating the tickets.

The location of the National Army cantonments on the Pacific Coast is the subject of a pamphlet, with a small map, which has been issued by E. G. McMicken, general passenger agent of the Pacific Steamship Company, San Francisco. Six pages of the pamphlet are occupied with pictures of the chevrons worn by various grades of officers and men in the army and in the navy.

R. H. Aishton, chairman of the central department committee of the Railroads' War Board, has sent to the railroads a circular calling attention to the very large prospective increase both in the number and weight of Christmas packages, and recalling the fact that to take care of this traffic is going to require every available baggage and express car, as well as some refrigerator and other special cars. He urges that all of this class of cars be made suitable for service and gotten off of repair tracks by the first part of December; and, further, that every means be used to induce the public to ship Christmas packages a week or ten days earlier than usual.

The Department of Agriculture issues warning that more care should be exercised in loading grapes, to prevent serious losses in transit. Twelve-quart baskets should never be loaded in cars more than eight high. When loaded nine high the bottom baskets are crushed and broken. All packages must be very firmly stowed in cars to prevent shifting of the load and consequent crushing of bottom layers. Large losses have been found to result from loading weak and broken packages at or near the bottom of the car. Where there has been a scarcity of suitable packages, losses have resulted from chucking, resulting from mixing packages. Trays, twelve-quart baskets, full bushel and half-bushel baskets have been loaded in the same car.

### New Boston & St. Louis Trains

The New York, New Haven & Hartford and the Pennsylvania announce that, beginning November 25, a new through passenger train will be run, by the Hell Gate Bridge Route, between Boston and St. Louis. By the tentative schedule the westbound train leaves Boston daily at 1:25 p. m.; Harrisburg, Pa., 11:40 p. m.; Pittsburgh, 6 a. m.; Columbus, 10:15 a. m.; Indianapolis, 3:25 p. m.; arriving at St. Louis 9:35 p. m. Eastbound, the train will leave St. Louis at 11:50 p. m.; Indianapolis, 7:45 a. m.; Columbus, 12:40 p. m.; Pittsburgh (eastern time), 7:10; Harrisburg, 1:15 a. m.; arriving in Boston at 11:30 a. m. Presumably the trains will stop at New York, N. Y., though that place is not mentioned in the list of way stations.



## Commission and Court News

### INTERSTATE COMMERCE COMMISSION

A hearing on some details connected with the protest of the Winston-Salem Southbound Railway to the tentative valuation of its property made by the Division of Valuation of the Interstate Commerce Commission was held before Examiner Staples at Washington on October 25.

Chairman Hall has addressed a letter to George Stuart Patterson, counsel for the eastern railroads, saying that the fifteenth section order of October 20 is not to be understood as precluding application for or the adoption of a speedier procedure in respect of the increased rates on commodities sought by the eastern carriers and set for hearing on November 5 in the fifteen per cent case.

The fifteenth section amendment of August 10, as applied to carriers ordered to remove a discrimination, apparently deprives them of the option which they have possessed hitherto, as to whether they will remove the discrimination by reducing the higher or raising the lower rate. This point came out in connection with tariffs filed by the Carolina, Clinchfield & Ohio, the Southern, the Norfolk & Western, and the Chesapeake & Ohio and their connections in the Bristol-Johnson City case. In compliance with the Commission's order in the complaint of the Johnson City (Tenn.) Chamber of Commerce v. Southern et al., the roads filed tariffs putting the Johnson City rates in effect at Bristol. The commission held that the Johnson City rates had not been shown to be unreasonable, but that they were unduly discriminatory against Johnson City and in favor of Bristol. Under the new law the carriers made what they thought would be a pro forma application for leave to file tariffs extending the Johnson City rates to Bristol. The commission has never ruled, formally that the new law applies to tariffs filed in obedience to the unamended law, but informally it has declined to place tariffs filed under such conditions in an exempted class, not subject to the so-called Smith amendment. At a so-called informal hearing on the tariffs on October 26, Frank Lyon, attorney for Bristol shippers demanded a formal hearing on the tariffs which have been filed. The commission undoubtedly will agree to this suggestion and have a formal proceeding; but the holding of the hearing will deprive the carriers of the increased revenue that would have resulted if the higher rates for Bristol had been allowed to take the course that has been the usual one in the past.

#### Rates on Rails to Seaboard

*West Virginia Rail Company v. Chesapeake & Ohio et al. Opinion by Commissioner Daniels:*

Rates on light steel rails in carloads from Huntington, W. Va., to New York, Philadelphia, Baltimore and eastern basing points, for domestic consumption, found unreasonable to the extent specified in the report. Reparation awarded. Rates on same for export, not found to have been unreasonable, or unduly prejudicial in respect of transportation initiated by the Chesapeake & Ohio, but held to have been unduly prejudicial on traffic originated by the Baltimore & Ohio. Export and domestic rates to the ports, for the future, permitted to be established on the basis voluntarily proposed by defendants. (46 I. C. C., 677.)

#### Hearings on Transcontinental Rates

Applications filed by the transcontinental roads under the amended 15th section of the act to regulate commerce involve a request for the approval by the commission of tariffs proposed to be filed by the transcontinental lines in purported compliance with the order of the commission dated June 30, 1917. Upon protest filed by Pacific Coast interests and others the commission has arranged to set these applications for informal hearing to be held before Attorney-Examiner Thurtell at Room 1809, 165 Broadway, New York City, on November 5; at the Federal building, Chicago, on November 12, and at the United States court rooms, Portland, Ore., on November 21, in order that the com-

mission may determine (1) whether or not the rates proposed are in compliance with the order of the commission aforesaid, and (2) to receive evidence upon the reasonableness and propriety of the increased rates proposed. The tariffs which the carriers ask permission to file are voluminous. They may be inspected at the office of the commission at Washington, but in order to apprise interested parties as to their character, Attorney-Examiner Thurtell will read, at the hearing on November 5, an abstract designed to elucidate their structure.

### STATE COMMISSIONS

The Public Service Commission of Alabama, to which application has been made to order the restoration of numerous passenger trains taken off several months ago, has deferred consideration of the question until its next monthly meeting. This action was taken in the expectation that the railroads and the public can come to an agreement.

The Railroad Commission of Louisiana has issued an order amending its rule No. 49 so as to require all railroads to provide equal but separate accommodations for white and colored passengers and to provide in both the white and the colored cars (or compartments) separate toilets for the sexes. The order must be complied with on or before May 1, 1918. There was some demand for separate smoking compartments both for the whites and the blacks making four classes of accommodations on every train—but the order says nothing about smoking compartments.

### COURT NEWS

#### Train Sheet Records as Evidence

In an action for damages for the destruction of growing timber by fire the Virginia Supreme Court of Appeals holds that records of entries made in the established course of business on train sheets by train despatchers, from reports telegraphed or telephoned them by station agents as to the time of arrival and departure of trains, are admissible in evidence to indicate the location of a train at a certain time.—*French v. Virginian (Va.)*, 93 S. E., 585. Decided September 20, 1917.

#### Scope of State Headlight Law

The Alabama Supreme Court holds that the Alabama Locomotive Headlight Law of 1915 has no application to engines engaged in interstate commerce, the federal act of 1911 as amended in March, 1915, having excluded the states from the right to legislate, though the final federal rules on the subject of head-lights were not promulgated until after a railroad charged with violating the Alabama law committed the offense.—*L. & N. v. State (Ala.)*, 76 So., 505. Decided June 30, 1917.

#### Abolition of Grade Crossings—Necessity of Taking Property

A city and several railroads, acting under a state statute giving the necessary authority, entered into a contract for the appropriation of land for yards to relocate the railroads, to elevate their tracks and to provide sites for municipal piers and other extensive improvements. In a suit for injunction by taxpayers, the Pennsylvania Supreme Court holds that a court will not interfere with the judgment of the contracting parties as to the necessity and extent of taking property, without strong and conclusive evidence that the taking was arbitrary, and not for legitimate railroad purposes.—*Chew v. City of Philadelphia (Pa.)*, 101 Atl., 915. Decided April 30, 1917.

#### Recovery for Undercharge—Establishment of Rates

A railroad suing to recover an undercharge on an interstate shipment of live stock is entitled to recover on showing the shipment, its legal duty to recover for the undercharge, and that its tariffs have been filed and published as provided by law. The Supreme Court of the State of Washington holds that, while establishment of a tariff rate depends on the tariffs being filed and posted . . . in "two conspicuous places," etc., such posting is not a condition precedent to a recovery for an undercharge if the establishment of the rate is shown by the filing and by providing its freight offices with copies.—*Northern Pacific v. Longmire (Wash.)*, 167 Pac., 79. Decided August 24, 1917.

### Crossing Accident—Contributory Negligence

In an action for personal injury to the plaintiff's foot, which was run over by a locomotive at a crossing, the Pennsylvania Supreme Court holds that, as it appeared the plaintiff stopped, looked and listened when he was on a track next to the one on which the locomotive approached, and did not see it, though its headlight was burning and he had an unobstructed view for 160 feet, and immediately started across the track and was struck, he was contributorily negligent, and judgment for the plaintiff was reversed and rendered for the defendant.—*Lapinco v. Philadelphia & Reading (Pa.)*, 101 Atl. 767. Decided April 9, 1917.

### Car Door Accident—Assumption of Risk by Passenger

In an action by a passenger for injuries to his fingers caused by being slammed in the jamb of a car door it appeared that the plaintiff was on a day coach approaching Scranton when the station was called and the car door into the vestibule was opened by the trainman. The plaintiff left his seat and went forward into the vestibule, preparatory to alighting. There he took a position facing the unopened vestibule door, through which he expected to go. To steady himself he placed his right hand against the jamb of the car door, with his fingers in the space between the door and the jamb. Before the station was reached the trainman reached from the vestibule into the car and pulled shut the door on the plaintiff's fingers. There was no evidence as to the reason for thus shutting the door. There was no proof that the trainman actually saw the position of the plaintiff's fingers, but it was contended he ought to have seen and given warning. The Pennsylvania Supreme Court held that the trainman was under no obligation to see where the plaintiff's fingers happened to be, nor to foresee any reasonable probability that they would be in such a position. The plaintiff, by leaving his seat and standing in the vestibule before the train stopped assumed the risk of what happened, even if he were not guilty of contributory negligence.—*L'Hommedieu v. D. L. & W. (Pa.)*, 101 Atl. 933. Decided May 7, 1917.

### Crossing Accident—Stop, Look and Listen

The Circuit Court of Appeals, Fourth Circuit, has affirmed the judgment of the federal district court, N. D. West Virginia, in favor of the defendant railroad in the crossing accident case of *Dernberger v. Baltimore & Ohio* (234 Fed. 405). An abstract of the district court's opinion, containing full details of the facts of the case, appeared in our issue of November 24, 1916, Vol. 61, p. 962. Stated briefly the action was for the death of a farmer, well acquainted with the crossing, who drove his team upon the track in front of a fast express train. The Circuit Court of Appeals in its opinion reviews the evidence at great length and cites many cases regarding the care required from persons approaching railroad crossings. It holds that where, notwithstanding obstructions to the view of approaching trains caused by a heavy growth of weeds, underbrush, etc., a driver on a highway could have seen or heard an approaching train in ample time to avoid being struck if he had looked and listened, but, from a point 150 feet from the crossing he drove towards and on it without looking and listening, apparently oblivious to the danger, he did not exercise the care that a reasonable man would take for his own safety, and there could be no recovery for his death. Under such circumstances the failure of the railroad to give the signal required by statute on approaching the crossing did not make it liable. The court said: "The danger incident to a crossing is increased or diminished according to the nature of the land on either side of the highway. . . . Where the banks are level and the intervening space between the road and the railroad consists of cleared land, the risk is less; but where as in this instance, it appears that there is a heavy growth of weeds, underbrush, etc., so as to obscure the view of the track beyond the crossing in the direction from whence the train comes, the risk is correspondingly increased. Such condition is a warning to the traveler of the imminence of danger, and in the nature of an admonition to exercise reasonable caution in approaching a railroad track; also, the means of transportation employed by the traveler becomes an important factor in determining the degree of diligence to be exercised. . . . No hard and fast rule as to the duty of a traveler on the highway to stop, look and listen before crossing a railroad can be laid down. Under some circumstances the railroad company may so act as to allay the sense

of danger and relieve the traveler from the obligation to stop, look and listen. A plain view of the track may make it no breach of duty for him not to stop or listen. He may be traveling on foot or so silently that he can listen as well going as stopping. The obstruction of the view may be such that he is obliged to depend upon his hearing without the aid of his sight. We, therefore, do not lay down the inflexible rule that a traveler must stop, look and listen under all circumstances." All that the court decided, therefore, was that the evidence excluded any other reasonable conclusion than that the negligent conduct of the deceased was the proximate cause of his death.—*Dernberger v. B. & O.*, 243 Fed. 21. Decided May 17, 1917.

### One-day Time Limit on Ticket Valid

The holder of a ticket with the time limit, "Good for continuous passage beginning date of sale only" printed on its face was ejected when he attempted to ride with it on the day following its date. In an action for damages for wrongful ejection the question was raised whether the time limit so imposed was lawful. The plaintiff contended that his rights were contractual, fixed by the contract of carriage between carrier and passenger, and that, therefore, the time limit, although printed on the face of the ticket, could not form a part of such contract or bind the plaintiff, unless he had actual notice of it and acquiesced therein at the time the contract of carriage was made; and this he denied. The railroad contended that the time limit was not a matter of contract, but merely a regulation for the conduct of its business, the validity of which was to be determined upon the sole inquiry of its reasonableness as such regulation, and not on any inquiry as to its invalidity as a contract between carrier and passenger. The Virginia Supreme Court of Appeals holds that a provision in a ticket, considered in its primary sense as evidence of the passenger's right to transportation, that it should be good only on the day of sale, is a reasonable regulation of the carrier and valid, in the absence of governmental regulation or statute to the contrary.—*L. & N. v. Rieley (Va.)*, 93 S. E. 574. Decided September 20, 1917.

### Fires Set by Locomotives—No Liability for Injury to Firemen or Fire Engines

The New Hampshire Supreme Court holds that the statute of that state making a railroad liable for damages to person or property from fires set by its locomotives has no application to the case of a fireman employed by a municipality to extinguish fires who was injured in attempting to extinguish a fire set by a railroad's locomotive. The statute applies to persons and property exposed to damage along the line of the road. It does not apply to firemen or fire engines whose exposure results from an attempt to extinguish the fire. Nor was the railroad liable at common law. The question was not one of proximate or remote cause, but whether the railroad owed any duty at all to the plaintiff—whether, apart from his contract of employment, it stood in any legal relation to him, however remote. The court held that it did not. Neither the plaintiff nor his property was in a position to be injured by a fire set by the railroad. His connection with the fire arose solely from his own act in coming into contact with it after it was set. Nor was the railroad liable because of his employment. Knowing that fires will occur from various causes, some culpable and some not, the plaintiff undertook the work of extinguishing all fires without reference to how they were caused. The danger of injury in doing such work was necessarily assumed by him.—*Clark v. Boston & Maine (N. H.)*, 101 Atl. 795. Decided June 5, 1917.

### Hours of Service Act—"Emergency" Different from "Casualty"

At a station where the only employee was both agent and telegrapher, the pipe leading up from a pump through the bottom of a water tank used for engines sprang a leak, so that it could not be drained. The weather was extremely cold, and the agent, recognizing that if water were allowed to stand motionless in the pipe it would freeze, communicated the fact to his superiors and was directed to remain on duty during the night, keeping up steam and running the pump at frequent intervals. It did not appear that it would have been impossible to have relieved the operator within the 17-hour period prescribed by section 2 of the law. The Circuit Court of Appeals, Sixth Circuit, affirming a



judgment of the district court for the Northern District of Ohio, holds that, as a casualty or unavoidable accident, to take the case out of the provision in section 3 of the act must be more than some occurrence of a more or less trifling nature, which might possibly be foreseen, it was a violation of the act to retain the operator on duty for more than 17 hours; it not appearing that the opening of the leak was unavoidable.

To make clear the reasoning of the court it is necessary to refer briefly to the sections of the act applicable to the case. Section 2 forbids the employment of day-time telegraph operators or train dispatchers longer than 13 hours, except in case of emergency, when they may be permitted to remain on duty for 4 additional hours in a 24-hour period not exceeding 3 days in any week. Section 3 provides that the act shall not apply in any case of casualty or unavoidable accident, or the act of God. The court said: "If the 'emergency' which will permit 17 hours' service under section 2, and the 'casualty or unavoidable accident' required to invoke the proviso of section 3, were the same thing there would be reason to say that the latter proviso did not cover the cases reached by the former; but there is not only a presumption of a difference in meaning from the fact that the words are selected and put into contrast, but they inherently imply distinction. Congress would naturally have foreseen that in the course of railroad service there would be a great number of unexpected conditions which would require the service of a telegrapher for a few extra hours, and which well might be termed emergencies, but which would not at all rise to the scope of an act of God, an unavoidable accident, or a casualty. While 'casualty' and 'unavoidable accident' are terms broad enough to cover many rather trifling things, yet their association in this section indicates that they were not used in any such broad sense, but only with reference to those extreme cases which justify coupling them with 'act of God.' This construction has been approved by those Circuit Courts which have passed on the question. *United States v. Mo. Pac.*, 213 Fed. 169; *San Pedro v. United States*, 230 Fed. 737; *Denver Ry. v. United States*, 233 Fed. 62.—*Baltimore & Ohio v. United States*, 243 Fed. 153. Decided May 8, 1917.

**CHILE INVITES TENDERS FOR LOCOMOTIVE BOILERS.**—The American ambassador at Santiago, Chile, cables that tenders have been requested by the Chilean Government for fifteen locomotive boilers which are urgently required for the state railroads. With their bids American manufacturers are required by the Chilean Government to present the requisite export licenses.—*Commerce Report*.

**SIBERIAN RAILROAD ONE-THIRD EFFICIENT.**—Inefficient transportation service by the Trans-Siberian Railroad is responsible for an immense congestion of traffic at Vladivostock, was the statement of S. R. Bertron, a member of the American Commission to Russia, at the second conference of the Russian-American Chamber of Commerce held recently in New York. "The Trans-Siberian Railroad is only giving about thirty per cent efficiency," Mr. Bertron said. "On the books of the line are double the number of locomotives the Pennsylvania Railroad has per mile. There are three times as many men employed on the Trans-Siberian Railroad as the Pennsylvania has, and yet the efficiency is only thirty per cent. Their failure to utilize to the fullest extent the facilities at their disposal has created a congestion at the port of Vladivostock, where 700,000 tons of material have accumulated. The road is moving only such stuff as is now entering the port, and no inroads are being made on the accumulated freight. The only remedy for this condition is by the introduction of more cars and locomotives. It is expected that our government will be able to introduce a total of 75 locomotives and 1,000 cars in Russia during the present year, but this is only a small fraction of what Russia requires in the way of railroad equipment. In addition to the Trans-Siberian line there will be available during the winter months only one additional line, the Kola Railroad, from the port of Murman. Plans are being made, with the assistance of the American Railway Commission in Russia, to place this line in working order, that its facilities may be of use during the winter months. If this line is placed in commission at the time of the closing of Archangel it will mean that about two thousand tons of material a day can reach Russia by way of the Atlantic Ocean." [Press despatches October 16 said that the Stevens Commission had improved the situation at Vladivostock, increasing the efficiency of the railroad 25 per cent.]

## Equipment and Supplies

### FREIGHT CARS

THE UNITED STATES NAVY DEPARTMENT is asking for prices on 4 40-ton single sheet box cars.

C. U. SNYDER & Co., Commercial Car Line, Chicago, Ill., has ordered 50 8,000-gal. capacity tank cars from the Pennsylvania Tank Car Company.

THE PETROLEUM REFINING COMPANY, Houston, Texas, reported in the *Railway Age Gazette* of October 12 as inquiring for 50 8,000-gal. capacity tank cars, has ordered these cars from the Pennsylvania Tank Car Company.

THE WESTERN PACIFIC, reported in last week's issue as having withdrawn its inquiries for freight cars, is inquiring for 1,500 steel underframe, 40-foot, 40-ton box cars, and for 300 steel frame, 36-foot and 50-ton general service cars.

THE ILLINOIS CENTRAL, reported in last week's issue as inquiring for prices on cars, has ordered 500 gondola cars from the Haskell & Barker Car Company and a like number from The Pullman Company. This company is asking for prices on 300 flat cars.

### SIGNALING

THE LONG ISLAND has ordered from the General Railway Signal Company a mechanical interlocking machine, 32 levers, for Far Rockaway, N. Y.

THE MISSOURI, KANSAS & TEXAS is to install an interlocking plant at North Jefferson, Mo.; Saxby & Farmer machine, 12 levers; installation by the railroad company's forces.

THE ATCHISON, TOPEKA & SANTA FE has ordered from the General Railway Signal Company the materials for an electric interlocking plant at Kelker, Col.; 28-lever machine model 2, with 21 working levers and 7 spare spaces.

THE GREAT NORTHERN has ordered from the General Railway Signal Company, Rochester, N. Y., 200 type 2A automatic block signals with the necessary batteries, relays, wires and other apparatus. These signals are to be installed by the railroad company's forces.

THE GENERAL RAILWAY SIGNAL COMPANY, Rochester, N. Y., has shipped to the South Eastern & Chatham Railway, of England, an electric interlocking machine of 200 levers. It is a "model 2" machine, unit lever type. This machine is for installation at Victoria station, London.

THE GRAND TRUNK is to install the "A P B" automatic block signal system on its line between Shelburne, N. H., and Bethel, Me., 15 miles, single track. The material has been ordered from the General Railway Signal Company and the railroad's forces will do the construction work.

THE NEW YORK CENTRAL is to enlarge its electric interlocking at Wesleyville, Pa., by adding 32 levers to the present 48-lever machine. At Dunkirk the same company will add 16 electric levers to the 60-lever mechanical interlocking lately installed there. Material for these two installations has been ordered from the General Railway Signal Company.

THE NORTHERN PACIFIC's plans for new automatic block signaling aggregate 228 miles of road, as follows: Rices, Minn., to Little Falls, 17 miles, double track; Easton, Wash., to Lester, Wash., 19 miles, double track; Toston, Mont., to Garrison, Mont., 92 miles, single track; Missoula, Mont., to De Smet, Mont., 7 miles, double track; De Smet to Paradise, 93 miles, single track. A total of 379 semaphores will be required; 1,100 relays, 188 switch circuit controllers and 400 cast iron battery chutes; all of which articles, with other material, have been ordered from the General Railway Signal Company. This company also has contracted to install the signals, which work, it is expected, will be completed by the Fall of 1918.

## Supply Trade News

The Falls Hollow Staybolt Company has removed its Chicago office from the Fisher Building to 654 Railway Exchange Building.

A. L. Whipple, who for two years has been sales manager of the Railway Improvement Company, 61 Broadway, New York City, has been made vice-president and assistant general manager of that company.

The Continental Construction Corporation has been chartered in Delaware with a capital of \$100,000 to manufacture railway supplies. The incorporators are: C. L. Rimlinger, M. M. Clancy, Wilmington, Del.; Clement M. Egner, Elkton, Md.

The United States Steel Corporation has declared the usual extra dividend of 3 per cent in cash and the regular quarterly dividend of  $1\frac{1}{4}$  per cent on the common stock, also the regular quarterly dividend of  $1\frac{1}{4}$  per cent on the preferred stock.

Charles E. Lee, formerly general superintendent of the Boston & Maine and more recently in the railroad supply business, has been appointed transportation manager of the Aberthaw Construction Company, headquarters at the Four River Ship Building Plant, Quincy, Mass.

Morrill Dunn, vice-president of McCord & Co., and Fred A. Preston, manager of sales of the P. & M. Company, Chicago, have been commissioned captains in the Signal Corps of the U. S. Army and have been assigned to duty with the Air Craft Production Board in France.

R. J. Morgan, who resigned his position with the Midvale Steel & Ordnance Company, has been appointed supervisor of sales of the American Steel Export Company, New York. Mr. Morgan prior to his connections with the Midvale Steel & Ordnance Company was thirteen years in the employ of the Carnegie Steel Company.

The Keith Railway Equipment Company, 122 South Michigan avenue, Chicago, recently bought 33 acres near Hammond, Ind., and has begun the construction of a shop, 200 ft. by 85 ft., for the construction and repair of tank cars. Later two other buildings will be added, one of which will be 350 ft. by 300 ft. and the other 200 ft. by 70 ft.

On October 1, 1917, the New York sales offices of the Edison Storage Battery Company, long located at 206 West Seventy-sixth street, moved into larger quarters, at 209 West Seventy-sixth street, right across the street from the old headquarters. At the new location many additional facilities have been installed to enable the manager, John Kelly, to take care of the increased business.

The Pacific Car & Foundry Company, Seattle, Wash., was recently incorporated to build standard railway equipment, logging cars, trucks, contractors' equipment, forgings, castings, iron and steel and railway supplies in general. The new company has taken over the business of the Seattle Car & Foundry Company and now operates fully equipped car plants both at Seattle, Wash., and Portland, Ore. The officers are: William Pigott, president; O. D. Colvin, vice-president and general manager; James F. Twohy, vice-president and treasurer; James E. McNery, secretary; T. G. Haywood, director of purchases.

J. J. Byrne has been appointed eastern representative of the Locomotive Stoker Company of Pittsburgh, Pa., with office at 50 Church street, New York City. Mr. Byrne entered railroad service in 1903, on the Cleveland, Cincinnati, Chicago & St. Louis as machinist's apprentice. He served four years in this capacity at the Delaware shops. He entered the service of the Lake Shore & Michigan Southern as machinist in 1907, and remained with that company until 1909, at which time he entered the employ of the Locomotive Stoker Company as mechanical expert. Mr. Byrne will still devote much of his time to the Southern roads.

Clement F. Street has opened an office as consulting mechanical engineer at 50 Church street, New York. He will give

special attention to questions of design and tests of railway equipment and specialties. Mr. Street at the age of 18 became a machinist's apprentice at the works of the Buckeye Engine Company, and after three years entered the drawing room of that company. Later he became chief draftsman of the Johnstown Company, Johnstown, Pa., leaving after two years to become chief draftsman in the motive power department of the Chicago & St. Paul Railway, where he remained for four years. In 1892 he became mechanical editor of the Railway and Engineering Review of Chicago. Seven years later he went with the Dayton Malleable Iron Company and for nine years was engaged in designing and selling railway supplies for this company, for the Wellman-Seaver-Morgan Company, Cleveland, Ohio, and for the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. In 1907 he started to develop a locomotive stoker with the financial assistance of the Westinghouse Air Brake Company, this work finally developing into the formation of the present Locomotive Stoker Company, of which Mr. Street was a vice-president. In 1916 the John Scott Legacy Medal and Premium was awarded to Mr. Street on the recommendation of the Franklin Institute of Philadelphia for his work in developing the Street stoker.

### Extension of Automatic Stop System on C. & E. I.

The Miller Train Control Corporation, Staunton, Va., and Danville, Ill., is extending the installation of its automatic train stop apparatus on the lines of the Chicago & Eastern Illinois. The new work is on the 62-mile single-track cutoff between Woodland Junction, Ill., and Villa Grove, over which is moved a heavy through traffic between Chicago and St. Louis. This installation when completed will make a total of 169 miles of line and 276 miles of track on this road operated under the Miller system. On the mileage where the system is at present in service there is a full equipment of automatic (visual) block signals, but the new installation is on an unsignaled line.

### Supply Companies to Discontinue Sending Holiday Cards

Recognizing that the sending of holiday greeting cards constitutes a burden on the country's mail service and serves no productive purpose during the war, a number of railway supply companies in Chicago have announced their intention to omit the distribution of such cards this year and instead to contribute money to war relief organizations. The announcement reads as follows:

"At this time of world war when money is so sorely needed to alleviate suffering, reduce hunger and care for the sick and wounded, it seems sheer waste to spend money for such unnecessary and unproductive things as holiday greeting cards.

"A number of companies and individuals, among them the undersigned, whose custom it has been to distribute such cards, have decided not to do so this year, but instead to contribute the money to war relief organizations, where it will perform some real service.

"As lack of time prevents a personal canvass of other steel producers and consumers, as well as business houses and banks in general, this form of letter is substituted, and it is hoped the suggestions offered may meet with wide approval and be productive of generous results.

"Contributions should be sent direct (together with a copy of this circular, if desired) to The American Red Cross, the American Fund for French Wounded, or any other relief organizations that may appeal to the giver."

This is signed by Illinois Steel Company; Morden Frog & Crossing Company; American Steel & Wire Company; Universal Portland Cement Company; Lackawanna Steel Company; Carnegie Steel Company; Inland Steel Company; Chicago Railway Equipment Company; A. M. Castle & Company; The P. & M. Company; A. J. O'Leary & Son Company.

### TRADE PUBLICATIONS

STAYBOLT IRON.—The Rome Iron Mills, Inc., 30 Church street, New York, has issued Bulletin No. 1 on Rome hollow staybolt iron. These staybolts are made with the tell-tale holes in them and the advantages obtained by using this material are explained. Illustrations showing the texture of the material from the nick and bend test and places in the firebox where these staybolts are particularly advantageous are shown.



## Railway Construction

**GULF COAST LINES.**—These lines have awarded a contract for the construction of a one-story depot, 34 ft. by 230 ft., at Beaumont, Tex., to cost about \$20,000. The building will be of brick construction on reinforced concrete footings and will have a composition roof. The contract was let to Herman Weber, Beaumont. The construction of tracks and other incidental improvements will cost \$30,000 additional. C. S. Kirkpatrick, chief engineer, Houston, Tex.

**ILLINOIS CENTRAL.**—This company has awarded a contract to G. A. Johnson & Son, Chicago, for the following improvements at Memphis, Tenn.: the construction of new racks and bins in the storehouse, remodeling the mill building, erection of platforms and incline at the mill building, plumbing and sewage work, construction of transfer table pit and engine hoist pit, and erection of coach yard building. The estimated cost of the work is \$50,000.

A contract for additional work at Clinton, Ill., has been awarded to T. S. Leake & Co., Chicago. Eleven stalls in the roundhouse will be lengthened at a cost of about \$60,000.

**MONONGAHELA & SOUTHERN.**—This company is building a 5-mile branch, to be known as the Clairton branch, from the main line of the Monongahela Southern at Bull Run, Pa., about two miles west of Duquesne to the new By-Product Coke Plant at Wilson. The contract for the grading has been awarded to the T. A. Gillespie Company, New York and Pittsburgh, and work has been commenced. The contract for the steel superstructures has been awarded to the American Bridge Company and track laying will be handled by the railroad forces. The grading work is heavy, calling for the excavation of about 1,200,000 cu. yd. unclassified. There will be a tunnel 1,700 ft. long, two steel railroad bridges 115 ft. and 430 ft. long respectively and four concrete arches, the largest being 50 ft. diameter inside and 425 ft. long. The amount of concrete will be about 75,000 cu. yd. including tunnel lining. The limiting grade southbound is about 1.6 per cent, northbound 1.25 per cent compensated. The maximum curvature is 7 deg. The new line will carry coke from the new By-Product Coke Plant at Clairton to the plants of the Carnegie Steel Company in the Pittsburgh district, also coal, finished steel products and by products from the coke plant. The company expects to complete the work within twelve months.

**MONTANA SOUTHERN.**—This company has awarded a contract to W. R. Allen, Butte, Mont., for the construction of a steam railway line from Divide, Mont., on the Oregon Short Line, up the Big Hole river through Dewey and Wise River to the Elkhorn mines in Beaver Head county, about 40 miles. The work involves a maximum grade of  $2\frac{1}{2}$  per cent, light bridge work and the construction of one tunnel 210 ft. long. The principal commodities the road will handle will be ore and timber. The line is now about 60 per cent completed.

**TEXAS & PACIFIC.**—This company is building a combination office building and warehouse, 36 ft. by 255 ft., the office portion of which will be two stories high and the wareroom one story. The structure will have a brick exterior and will cost about \$30,000. The Watson Company, Dallas, Tex., has the contract.

**MONEY CHANGERS RUSHED.**—The busiest money changing office in the world is at Victoria Station, London, where soldiers on leave receive English money for French. Nearly every day it is more than \$80,000. Since the opening of the office two and a half years ago more than \$15,000,000 has been changed.

**INCREASED COAL PRODUCTION IN FRANCE.**—The monthly production of coal in France has increased from 1,576,062 tons in June, 1916, to 2,345,251 tons in June, 1917, the output of the French coal mines having increased almost steadily during the intervening period. The increase in the output has continued since June, 1917, at which time the total French production, added to the imports of British coal, reached a total of over 3,960,000 tons. French production and British imports in August, 1917, amounted to 4,346,000 tons, the French mines having produced 2,666,000 tons, as compared with 1,616,000 tons in August, 1916.

## Railway Financial News

**ATCHISON, TOPEKA & SANTA FE.**—See editorial comments elsewhere in this issue.

**CHESAPEAKE & OHIO.**—At the annual meeting of this company the date for holding annual meetings was changed from October to the first Tuesday in April.

**CINCINNATI, HAMILTON & DAYTON.**—The Delphos branch of this line extending from Dayton, Ohio, to Delphos, has been sold to John Ringling, circus owner, for the price of \$275,000. The sale was confirmed by Judge Hollister in the U. S. District Court at Cincinnati. With the entry of this decree the second receivership of the Cincinnati, Hamilton & Dayton will be at an end. The total bonded indebtedness of the railway company was approximately \$33,200,000. The amount received from the sales of the main line and the Delphos and Ironton divisions was between \$5,000,000 and \$6,000,000.

**EVANSVILLE & INDIANAPOLIS.**—See article on Court Takes Control of Rate-Making elsewhere in this issue.

**WASHINGTON, BALTIMORE & ANNAPOLIS.**—This company has declared an initial dividend of 3 per cent on the \$3,000,000 common stock, payable October 31 to stock of record October 25.

**RAILWAY PROGRESS IN SOUTH AFRICA.**—According to the report for 1916 of the general manager of railways and harbors in South Africa there were 9,419 miles of South African railways open to traffic on December 31 last as compared with 9,033 miles at the end of 1915. The total mileage of railways operated by the administration at the end of 1916 was 11,355. Of the 386 miles opened during the year about 110 miles were in the Cape Province, 158 miles in the Transvaal, 77 miles in the Orange Free State, and 39 miles in Natal.

**GRADE OF DOMINICAN CENTRAL REDUCED.**—A new cut-off 3 miles long, between Barrabas and La Sabana, was recently completed by the Dominican Central, which is owned and operated by the Dominican Government. The new line reduces the grade from  $9\frac{1}{2}$  to 3 per cent and the maximum curvature to 32 degrees. This corresponds to the remainder of the road between Bajabonico and Moca, the terminus. The same tonnage that is hauled over the new line may be carried through to the end of the railroad. It is not feasible to reduce this maximum grade of 3 per cent or the degree of curvature, as the cost would be prohibitive. The new line is laid with 60-lb. American rails, all stone ballasted. Bridges and culverts are of reinforced concrete. The change will greatly reduce the cost of operation and maintenance. The train tonnage will be increased five-fold.—*Commerce Report.*

**TRAVELING IN MODERN RUSSIA.**—A most entertaining picture of present-day railway travel in Russia was recently contributed to the Daily Mail (London), by Alexander M. Thompson, a well-known writer on labor matters. Mr. Thompson desired to travel from Petrograd to Moscow, and was "enviously congratulated" by his Russian friends when he succeeded, through a friendly commissionaire, in booking a sleeping berth at less than four times the official price. The explanation is that in Russia it is the practice of speculators to buy up railway tickets and sell them at huge profits, and unless the intending passenger is prepared to stand in a queue at a ticket office for a couple of days, he is compelled to patronize one of these speculators. Mr. Thompson's train, the last of the day, was due to start at 10 o'clock on a Tuesday. When he arrived at the station, in very good time, he was informed that the train had started three hours earlier. Two very helpful suggestions were then made, that he might stand all night in the corridor or guard's van of another train or return to his hotel and wait until the next day, when he might perhaps have better luck. "When I told my Russian friends who had congratulated me on my extraordinary good fortune in securing the ticket," continued Mr. Thompson, "they merely shrugged their shoulders comfortably and murmured the magic word Nitchivo (never mind), and assured me 'That's Russia.' Meanwhile I wonder when I shall reach Moscow. Nitchivo."

# ANNUAL REPORT

## ATCHISON, TOPEKA & SANTA FE RAILWAY—TWENTY-SECOND ANNUAL REPORT

SEPTEMBER 11, 1917.

### To the Stockholders:

Your Directors submit the following report for the fiscal Year July 1, 1916, to June 30, 1917, inclusive.

The Lines comprising the Atchison System, the operations of which are embraced in the following statements, and the mileage in operation at the end of the year as compared with the previous year, are as follows:

	June 30, 1917.	June 30, 1916.
Atchison, Topeka & Santa Fe Railway.....	8,639.53 miles.	8,647.87 miles.
Rio Grande, El Paso & Santa Fe Railroad.....	20.22 "	20.22 "
Gulf, Colorado & Santa Fe Railway.....	1,937.21 "	1,937.59 "
Panhandle & Santa Fe Railway.....	665.02 "	665.02 "
	11,261.98 "	11,270.70 "

The average mileage operated during the fiscal year ending June 30, 1917, was 11,270.17 miles, being an increase of 23.37 miles as compared with the average mileage operated during the preceding fiscal year.

In addition to lines covered by this report there were completed on June 30, 1917, 50.70 miles of additional line, all of which will be ready for operation in the near future.

The Company also controls, through ownership of stocks and bonds, other lines aggregating 161.33 miles, and is interested jointly with other companies in 601.87 miles.

### INCOME STATEMENT.

The following is a summary of the transactions of the System for the years ending June 30, 1916 and 1917:

	1916.	1917.
Operating Revenues .....	\$133,762,392.24	\$156,179,120.54
Operating Expenses .....	83,730,960.35	96,333,568.67
Net Operating Revenue .....	\$50,031,431.89	\$59,845,551.87
Taxes .....	6,210,366.13	9,870,634.29
Uncollectible Railway Revenues.....	41,072.53	23,242.60
Operating Income .....	\$43,779,993.23	\$49,951,674.98
(Other Income .....	3,307,129.56	3,448,291.26
Gross Corporate Income.....	\$47,087,122.79	\$53,399,966.24
Rentals and Other Charges.....	1,977,654.79	2,078,048.92
	\$45,109,468.00	\$51,321,917.32
Interest on Bonds, including accrued interest on Adjustment Bonds.....	12,529,733.40	12,112,843.95
Net Corporate Income (representing amount available for dividends and surplus and for necessary but unproductive or only partially productive expenditures) .....	\$32,579,734.60	\$39,209,073.37

From the net corporate-income for the year the following sums have been deducted:

DIVIDENDS ON PREFERRED STOCK—	
No. 37 (2½%) paid Feb. 1, 1917 .....	\$3,104,342.50
No. 38 (2½%) paid Aug. 1, 1917 .....	3,104,342.50
	\$6,208,685.00

DIVIDENDS ON COMMON STOCK—	
No. 45 (1½%) paid Sept. 1, 1916 .....	\$3,223,177.50
No. 46 (1½%) paid Dec. 1, 1916 .....	3,245,947.50
No. 47 (1½%) paid Mar. 1, 1917 .....	3,281,737.50
No. 48 (1½%) paid June 1, 1917 .....	3,290,767.50
	13,041,630.00

Appropriation for Fuel Reserve Fund....	56,210.37
California-Arizona Lines Bonds Sinking Fund .....	14,626.58
S. F. & S. J. V. Ry. Bonds Sinking Fund...	12,710.00
Income Appropriated for Investment in Physical Property:	
(a) For Equipment .....	11,000,000.00
(b) For other additions and betterments.	8,875,211.42
	39,209,073.37

Surplus to credit of Profit and Loss June 30, 1916.....	\$26,686,308.01
Additions to Profit and Loss Account (Sundry Adjustments) .....	466,805.89
	\$27,153,113.90
Surplus appropriated for Investment in Physical Property....	164,570.25
Surplus to credit of Profit and Loss June 30, 1917.....	\$26,988,543.65

Income from sources other than earnings from operation consisted of interest on cash in banks and sums collected as interest and dividends upon bonds and stocks of companies, the operations of which are not included in the System accounts.

During the fiscal year the sum of \$400,000 in cash was received as the net proceeds of sale of land embraced in the Santa Fe Pacific Land Grant, but this was directly written off the book value of Railroads, Franchises and Other Property and the transaction does not appear in the Income Account. The appropriation of \$11,000,000 for investment in equipment is somewhat less than the anticipated cost of equipment which has already been ordered but the delivery of which has been delayed by the extraordinary conditions growing out of the war. These extraordinary conditions also result in this equipment costing nearly twice what would be its normal cost.

### CAPITAL EXPENDITURES AND REDUCTION OF BOOK VALUES.

The total charges to Capital Account, as shown by the General Balance Sheet, page 30, at June 30, 1917, aggregated \$742,631,861.89 as compared with \$715,477,622.71 at June 30, 1916, an increase during the year of \$27,154,239.18, which analyzes as follows:

Construction and acquisition of new mileage, including the acquisition of bonds and stocks of other railway and terminal companies:	
Barton County & Santa Fe Ry.....	\$183,913.67
California, Arizona & Santa Fe Ry.....	3,202.15
Eastern Ry. of New Mexico.....	369.86
Grand Canyon Ry.....	4,621.78
Minkler Southern Ry.....	651,324.48

North Texas & Santa Fe Ry.....	765,634.62
Oil Fields & Santa Fe Ry.....	23,071.34
Oklahoma Central R. Ry.....	26,387.44
Osage County & Santa Fe Ry.....	43,289.83
South Plains & Santa Fe Ry.....	923,088.88
Verde Valley Ry.....	258,000.00
	\$2,882,904.05

### Additions and Betterments—System Lines:

Fixed Property .....	\$8,350,070.21
Equipment .....	225,554.84
Betterments to Equipment.....	215,825.53
	8,340,340.90

### Fuel Lands and Other Properties:

Fuel Lands .....	\$113,246.85
Real Estate held for future use.....	263,850.83
Tie and Timber Lands.....	25,089.23
Miscellaneous Items .....	209,205.38
	192,981.53

Other Investments .....	16,288,852.06
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Total Charges .....	\$27,705,078.54
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### Reduction of Book Values:

Beaumont Wharf & Terminal Co.....	\$36,000.00
Sunset Ry.....	19,000.00
Santa Fe Pacific R. R.—Land Sales.....	400,000.00
Western Oklahoma Ry.—Land Sales.....	1,624.00
Ice Plant, Belen .....	11,319.61
Ice Plant, San Bernardino.....	63,503.85
Santa Barbara Tie & Pole Co.....	19,391.90
	550,839.36

Net Increase in Capital Account during the year.....	\$27,154,239.18*
--	------------------

### Credits in italics.

\*Of this amount the sum of \$14,773,600 represents temporary investments in short term notes and other quickly convertible securities, which sum should be deducted in order to make satisfactory comparison with preceding years. The "Net Increase in Capital Account during the year" after deducting the sum of these temporary investments was \$12,380,639.18.

The credit item of \$225,554.84 for "Equipment" analyzes as follows:

Equipment retired during the year:	
26 Locomotives .....	\$395,926.81
1,256 Freight-Train Cars.....	652,678.20
36 Passenger-Train Cars .....	188,996.62
257 Miscellaneous Work Cars.....	59,214.47
Miscellaneous Adjustments .....	25,026.37
	\$1,321,842.47

### Less—Equipment added as follows:

11 Locomotives .....	\$287,622.66
427 Freight-Train Cars .....	436,824.50
3 Passenger-Train Cars .....	6,220.29
Motor Equipment of Cars.....	1,272.32
1 Car Float .....	47,722.57
583 Miscellaneous Work Cars.....	315,935.29
1 Automobile .....	690.00
	\$1,096,287.63

	\$225,554.84
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The 1,256 freight-train cars reported as retired and the 583 miscellaneous work cars added, include 549 cars, which, being permanently assigned to work service, were relettered in work service equipment series during the year and transferred from freight equipment to work service equipment at their depreciated value at time of relettering.

In addition to the equipment reported retired as above, 7 freight-train cars and 3 miscellaneous work cars leased from the Oklahoma Central Railroad Company, were also retired during the year and liability therefor included in Other Unadjusted Credits in the General Balance Sheet, page 31.

### MAINTENANCE OF EQUIPMENT.

The following statement shows the sums charged to Operating Expenses for Maintenance of Equipment during each year since July 1, 1896:

Year ending June 30.	Average Operated Mileage.	Total Expenditure.	Expenditure Per Mile.
1897.....	6,443.81	\$3,443,884.82	\$534.45
1898.....	6,936.02	4,659,277.99	671.75
1899.....	7,032.62	4,810,795.64	684.07
1900.....	7,341.34	5,267,832.40	717.56
1901.....	7,807.31	6,257,456.57	801.49
1902.....	7,855.38	7,864,951.25	1,001.22
1903.....	7,965.13	8,510,543.09	1,068.48
1904.....	8,179.59	10,006,135.41	1,223.31
1905.....	8,305.40	10,914,864.47	1,314.19
1906.....	8,433.99	10,720,040.43	1,271.05
1907.....	9,273.15	11,779,846.64	1,270.32
1908.....	9,415.01	14,246,621.44	1,513.18
1909.....	9,794.86	13,903,897.37	1,419.51
1910.....	9,916.33	15,560,047.44	1,569.13
1911.....	10,350.13	16,686,145.45	1,612.17
1912.....	10,627.92	16,521,231.41	1,554.51
1913.....	10,750.31	19,415,224.63	1,806.02
1914.....	10,908.52	19,100,724.51	1,750.99
1915.....	11,114.52	19,764,535.40	1,778.26
1916.....	11,246.80	20,514,960.18	1,824.07
1917.....	11,270.17	25,273,168.92	2,242.48

The heavy increase of 1917 over 1916 is due largely to increases in wages and in cost of materials.

For the year ending June 30, 1917, maintenance charges, including renewals and depreciation, averaged as follows:

Per locomotive .....	\$6,542.04
Per locomotive mile .....	.2035
Per freight car .....	145.28
Per freight car mile .....	.0104
Per passenger car, including mail and express.....	1,621.48
Per passenger car mile .....	.0167

The foregoing average maintenance charges include a proportion of unlocated expenditures for Maintenance of Equipment charged to Superintendence, Shop Machinery, Injuries to Persons, Insurance, Stationery and Printing, Other Expenses, and Maintaining Joint Equipment at Terminals. Refrigerator cars are not taken into consideration in arriving at freight car averages, such cars being operated by The Santa Fe Refrigerator Despatch Company, which bears the expense of their maintenance.



## MAINTENANCE OF WAY AND STRUCTURES.

The following statement shows the sums charged to Operating Expenses for Maintenance of Way and Structures during each year since July 1, 1896:

Year ending June 30.	Average Operated Mileage.	Total Expenditure.	Expenditure Per Mile.
1897.....	6,443.81	\$6,282,923.15	\$975.03
1898.....	6,936.02	8,281,397.88	1,193.97
1899.....	7,032.62	7,672,107.62	1,090.93
1900.....	7,341.34	6,354,372.10	865.56
1901.....	7,807.31	6,433,840.36	824.08
1902.....	7,855.38	6,141,466.39	781.82
1903.....	7,965.13	9,304,892.04	1,168.20
1904.....	8,179.59	9,170,234.07	1,121.11
1905.....	8,305.40	11,385,418.33	1,370.85
1906.....	8,433.99	12,475,407.97	1,479.18
1907.....	9,273.15	15,286,062.66	1,648.42
1908.....	9,415.01	14,120,828.02	1,499.82
1909.....	9,794.86	12,884,406.81	1,315.43
1910.....	9,916.33	17,807,136.20	1,795.74
1911.....	10,350.13	16,059,786.90	1,551.65
1912.....	10,627.92	16,076,833.75	1,512.70
1913.....	10,750.31	18,054,413.03	1,679.43
1914.....	10,908.52	15,308,780.25	1,403.38
1915.....	11,114.52	16,514,467.89	1,485.85
1916.....	11,246.80	19,518,635.03	1,735.48
1917.....	11,270.17	19,119,336.16	1,696.45

In 1916 Maintenance of Way and Structures included over \$1,500,000 on account of the storm at Galveston and of the floods in California and Arizona. If this abnormal expenditure were excluded from 1916, the year 1917 would show an increase over 1916 of more than \$1,100,000, due principally to increases in wages and in cost of materials.

## COMPARISON OF OPERATING RESULTS.

The following is a statement of revenues and expenses of the System for the fiscal year ending June 30, 1917, in comparison with the previous year:

	Year Ending June 30, 1917.	Year Ending June 30, 1916.	Increase or Decrease.
OPERATING REVENUES:			
Freight .....	\$111,809,085.10	\$91,432,428.97	\$20,376,656.13
Passenger .....	32,770,088.51	31,568,600.55	1,201,487.96
Mail, Express, and Miscellaneous .....	11,599,946.93	10,761,362.72	838,584.21
Total Operating Revenues.....	\$156,179,120.54	\$133,762,392.24	\$22,416,728.30
OPERATING EXPENSES:			
Maintenance of Way and Structures .....	\$19,119,336.16	\$19,518,635.03	—\$399,298.87
Maintenance of Equipment..	25,273,168.92	20,514,960.18	4,758,208.74
Traffic .....	2,780,823.48	2,755,735.84	25,087.64
Transportation—Rail Line....	45,910,504.94	38,281,053.78	7,629,451.16
Miscellaneous Operations....	184,248.47	.....	184,248.47
General .....	3,494,122.42	2,904,040.13	590,082.29
Transportation for Investment—Cr .....	428,635.72	243,464.61	185,171.11
Total Operating Expenses.....	\$96,333,568.67	\$83,730,960.35	\$12,602,608.32
Net Operating Revenue.....	\$59,845,551.87	\$50,031,431.89	\$9,814,119.98
Ratio of Operating Expenses to Operating Revenues.....	61.68	62.60	—92

Credits in italics.

The average tons of freight (revenue and company) per loaded car mile increased from 19.96 to 20.56, or 3.01 per cent.

The average tons of freight (revenue and company) carried per freight-train mile (freight and mixed) increased from 468.10 to 497.75, or 6.33 per cent.

The average freight revenue per freight-train mile increased from \$3.74 to \$4.05, or 8.29 per cent.

The average passenger revenue per passenger-train mile increased from \$1.18 to \$1.23, or 4.24 per cent.

The average passenger-train revenue per passenger-train mile increased from \$1.49 to \$1.56, or 4.70 per cent.

The tons of freight carried one mile (revenue and company, but excluding water ton miles) increased 2,285,850,242, or 19.95 per cent., while miles run by freight cars (loaded and empty) in freight and mixed trains increased 132,403,672, or 16.86 per cent., and the mileage of such trains increased 3,134,586, or 12.81 per cent.

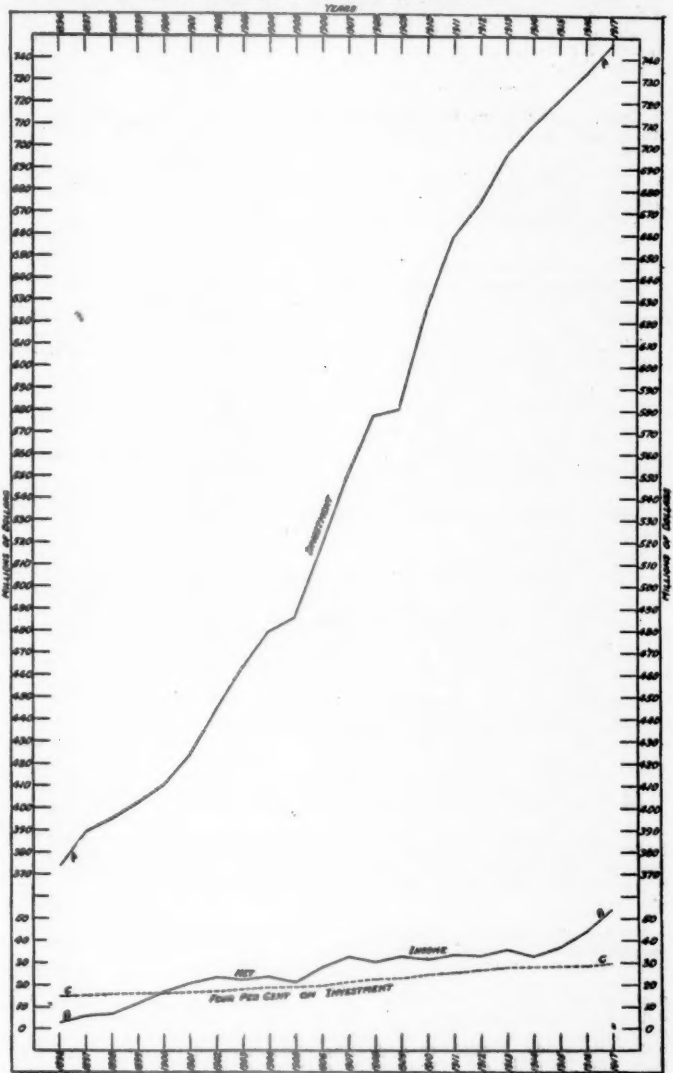
The number of passengers carried one mile decreased 144,934,949, or 9.15 per cent., while miles run by passenger-train cars (excluding work) in passenger and mixed trains decreased 2,513,288, or 1.52 per cent., and the mileage of such trains decreased 77,901 or .29 per cent.

The following is a consolidated statement of the business of the System for each fiscal year during the period since January 1, 1896:

Fiscal Year Ending June 30.	Average Miles Operated.	Gross Revenues, Including Income from Other Sources.	Expenses, Including Taxes, Rentals and Other Charges.	Interest on Bonds.	Net Corporate Income.
1897*.....	6,443.81	\$44,532,628.99	\$36,038,455.30	\$8,440,387.91	\$53,785.78
1898.....	6,936.02	39,396,126.41	30,513,553.17	7,045,988.30	1,836,584.94
1899.....	7,032.62	40,762,933.47	29,332,964.11	7,241,972.00	4,187,997.36
1900.....	7,341.34	46,498,899.04	29,414,427.56	7,345,166.50	9,739,304.98
1901.....	7,807.31	54,807,379.78	34,502,039.87	7,830,810.83	12,474,529.08
1902.....	7,855.38	60,275,944.33	36,272,432.45	8,438,985.00	15,564,526.88
1903.....	7,965.13	63,668,390.99	40,635,576.48	9,134,485.24	13,898,329.27
1904.....	8,179.59	69,419,975.41	44,641,434.10	9,418,770.00	15,359,771.31
1905.....	8,305.40	69,189,739.65	47,835,883.50	9,611,510.09	11,742,346.06
1906.....	8,433.99	79,390,749.05	51,035,355.71	10,622,184.22	17,733,209.12
1907.....	9,273.15	94,436,574.68	61,779,916.16	11,487,934.70	21,168,723.82
1908.....	9,415.01	91,289,770.61	65,031,582.67	12,579,301.77	13,678,886.17
1909.....	9,794.86	95,424,091.89	61,458,019.13	13,548,081.93	20,417,990.83
1910.....	9,916.33	107,543,250.16	75,133,314.54	11,984,151.36	20,425,784.26
1911.....	10,350.13	109,772,481.69	75,689,094.83	12,712,319.31	21,371,067.55
1912.....	10,627.92	110,322,328.13	77,001,227.38	13,660,859.50	19,660,241.25
1913.....	10,750.31	119,411,875.94	83,432,816.21	13,825,325.40	22,153,734.33
1914.....	10,908.52	113,284,122.98	80,213,746.06	12,886,412.23	20,183,964.69
1915.....	11,114.52	120,662,737.93	83,746,128.92	12,785,747.10	24,130,861.91
1916.....	11,246.80	137,069,521.80	91,960,053.80	12,529,733.40	32,579,734.60
1917.....	11,270.17	159,627,411.80	108,305,494.48	12,112,843.95	39,209,073.37

\*18 months.

The following chart brings out still more clearly the significance of the statement and strikingly depicts the progressive increase in investment which has been necessary to enable the Company to render its public service.



Line "A" is Investment in Property including Material and Supplies.

Line "B" is the Net Income Applicable to Bond Interest, Dividends, Improvement of Property and Strengthening of Credit.

Line "C" is the Amount of Income which would be equivalent to Four Per Cent. on the Investment shown.

## PROPERTY INVESTMENT AND RATE OF RETURN.

The following statement shows, for each year, the amount of investment, the amount of net income applicable to bond interest, dividends, improvement of property and strengthening of credit, and the rate of return which such net income represents on the amount of the investment.

Year Ending June 30.	Property Investment.*	Income Applicable to Bond Interest, Dividends, Improvement of Property and Strengthening of Credit.	Per Cent. of Property Investment.
1896 (6 months).....	\$373,260,004.67	\$2,432,870.06	.65
1897.....	389,118,442.87	6,070,364.45	1.56
1898.....	394,170,563.40	8,871,947.26	2.25
1899.....	402,388,222.21	11,409,315.36	2.84
1900.....	409,670,087.91	17,064,850.91	4.17
1901.....	423,734,716.52	21,196,714.38	5.00
1902.....	445,314,062.19	23,921,018.14	5.37
1903.....	463,230,180.22	23,032,814.51	4.97
1904.....	479,324,339.26	24,778,541.31	5.17
1905.....	485,497,374.42	21,353,856.15	4.40
1906.....	515,557,913.70	28,355,393.34	5.50
1907.....	550,693,087.37	32,724,274.07	5.94
1908.....	577,433,073.23	25,633,510.34	4.44
1909.....	580,297,115.78	33,523,437.28	5.78
1910.....	625,401,211.54	32,387,712.39	5.18
1911.....	658,156,763.91	34,102,511.86	5.18
1912.....	673,465,876.49	33,321,100.75	4.95
1913.....	695,730,983.22	36,078,744.55	5.19
1914.....	709,304,446.55	33,070,376.92	4.66
1915.....	720,792,460.35	36,928,030.11	5.12
1916.....	732,403,747.71	45,312,106.50	6.19
1917.....	746,839,609.72	51,788,723.21	6.93
Annual Average.....	\$547,808,376.51	\$27,132,940.18	4.95

\* The amount shown above as "Property Investment" includes sums invested in material and supplies. The amount for year 1917 excludes temporary investments in short term notes and other quickly convertible securities referred to in note on page 11.

† The "Income" shown above is determined after allowing for adjustments made through profit and loss.

The development of the Company's business and of its efficiency have been due principally to the very large expenditures (over \$331,000,000) which have been made in the extension and improvement of the property since January 1, 1896. In order to make such expenditures, your Company has raised since 1896 over \$225,000,000 of "new money" by the sale of capital stock and of bonds which are now outstanding or which (in the case of many of the Convertible Bonds sold) are represented by common stock now outstanding.

#### CAPITAL STOCK AND FUNDED DEBT.

The outstanding Capital Stock (deducting stock in treasury) on June 30, 1916, consisted of:	
Common .....	\$214,312,500.00
Preferred .....	124,173,700.00
	<b>\$338,486,200.00</b>
Issued during the year:	
Common Stock issued in exchange for Convertible Bonds retired .....	5,336,000.00
Capital Stock outstanding June 30, 1917:	
Common .....	\$219,648,500.00
Preferred .....	124,173,700.00
	<b>\$343,822,200.00</b>

The number of holders of the Company's capital stock on June 30, 1917, and the changes in number for the year were as follows:

	Number of Stockholders.	Increase or Decrease for the Year.
Preferred .....	17,098	Decrease 28
Common .....	26,750	Increase 257
The outstanding Funded Debt of the System (deducting bonds in the treasury) amounted on June 30, 1916, to...		
		<b>\$301,552,353.50</b>

The following changes in the Funded Debt occurred during the year:

Obligations Issued:	
California-Arizona Lines First and Refunding Mortgage 4½% Bonds .....	\$52,545.60
Obligations Purchased or Retired:	
S. F. & S. J. V. Ry. Co. First Mortgage 5% Bonds .....	\$11,000.00
Convertible 4% Bonds .....	5,336,000.00
Convertible 5% Bonds:	
Retired .....	6,883,000.00
Matured Unpaid transferred to Current Liabilities .....	566,000.00
	<b>12,796,000.00</b>
Decrease of Funded Debt .....	<b>\$12,743,454.40</b>
Total System Funded Debt outstanding June 30, 1917 .....	<b>\$288,808,899.10</b>

Interest charges for year ending June 30, 1918, will be approximately \$11,742,000 or an average monthly charge of about \$978,500. In making this approximation, exchanges of Convertible Bonds for Common Stock made since June 30, 1917, aggregating \$481,000 are considered.

#### TREASURY.

Neither this Company nor any of its auxiliaries has any notes or bills outstanding.

The Company held in its treasury on June 30, 1917, \$39,047,787.80 cash, and also had available \$5,281,000 General Mortgage Bonds, including bonds not yet certified by the Trustee. The Company also had in the treasury unpledged a large amount of stocks and bonds of other companies, of which part are carried in the balance sheet as Investments and part are included under Railroads, Franchises and Other Property. In addition, the Company and its affiliated companies have invested \$14,773,600 in short term notes and other quickly convertible securities.

#### FUEL RESERVE FUND.

The fund has been increased during the year by appropriations of income, as follows:

Amount to credit of Fund June 30, 1916 .....	\$1,888,316.42
Added during the year .....	56,210.37
In Fund June 30, 1917 .....	<b>\$1,944,526.79</b>

#### BARTON COUNTY AND SANTA FE RAILWAY.

A company has been organized to construct this line, extending north-west from Holyrood, Ellsworth County, Kansas, a distance of about 32 miles. Construction is in progress and it is expected the line will be completed by the close of the present calendar year. The new line will serve a good agricultural section and should be a valuable feeder to the System.

#### MINKLER SOUTHERN RAILWAY.

The completion of the extension of this line, from Lindsay to Porterville, California, referred to in the last annual report, has been somewhat delayed. However, 10.8 miles had been completed at June 30, 1917, and the remainder of the extension to Porterville will be ready for operation in the near future. A further extension of this line from Porterville to Ducor, a distance of approximately 13 miles, is under construction and will, it is expected, be completed and ready for operation not later than January 1 next. Arrangements have been made by a long term agreement with the Southern Pacific Company for the joint use of that company's line from Ducor to Oil Junction, a distance of 39.5 miles, from which latter point a connection, 3.5 miles in length, will be built to the company's main line near Bakersfield, thus giving the Company a direct easterly outlet for the traffic originating in the Minkler Southern territory.

#### NORTH TEXAS AND SANTA FE RAILWAY.

This line is being constructed from the main line at or near Shattuck, Ellis County, Oklahoma, westward into Hansford County, Texas, a distance of about 82 miles. Track laying is under way and, if labor conditions permit, the line should be completed and in operation before the end of the current year. The district served by this line is good agricultural land, already fairly well settled and under cultivation, and badly needs transportation facilities.

#### OIL CITY BRANCH.

Negotiations with the Southern Pacific Company looking to the purchase of an undivided one-half interest in this line, extending from Oil Junction to Ainroff, Kern County, California, a distance of 6.35 miles, with a branch of 2.47 miles in length, extending from said line at Treadwell Junction to the station of Porque, Kern County, have been completed during the year, and transfer of such half interest to your Company only awaits the formal

approval of the Railroad Commission of the State of California. After such approval is given, this line will be operated for the joint account of the two companies and will give your company direct access over its own rails to the Kern River oil field. The proposed connection between Oil Junction and Bakersfield, referred to under the heading of "Minkler Southern Railway" will also give the Company a direct connection with the Oil City Branch.

#### OSAGE COUNTY AND SANTA FE RAILWAY.

This company has been organized to construct a line from Owen, Washington County, Oklahoma, to a connection with the Eastern Oklahoma Division of your main line near Fairfax, a distance of about 62 miles. The line will traverse an important section of the mid-continent oil fields, and moreover will form an important cut-off for business between Kansas City and Oklahoma-Texas points. Right of way has been arranged for and construction is about to commence, but the line will not be ready for operation until the latter part of next year.

#### SOUTH PLAINS AND SANTA FE RAILWAY.

This line, formerly known as Crosbyton-Southplains Railroad (name changed during the year) extends from Lubbock, Texas, to Crosbyton, Texas, a distance of 38 miles, with an extension under construction running southwest from Lubbock for a distance of about 65 miles, of which 39.9 miles were completed at June 30, 1917. It is expected the remainder of the line will be completed and ready for operation by January 1 next.

#### MATERIAL AND SUPPLIES.

The balance sheet shows an increase of \$2,055,222.83, in the value of material and supplies on hand at June 30, 1917, as compared with the balance at the close of the previous year. This increase is due to a somewhat larger stock of material and supplies, rather than the use in its valuation of the high prices now prevailing, the material and supplies having been inventoried at normal prices.

#### TAXES.

Federal, state and local tax accruals for the year ending June 30, 1917, aggregate the large total of \$9,870,634.29, and show an increase over the preceding year of \$3,660,268.16.

For the first time Federal taxes have become a matter of serious concern. Indeed, the Company's tax situation is revolutionized by the new system of Federal taxation recently adopted and which applies to all of the calendar year 1917. The change wrought is not adequately indicated by the increase in taxes for the fiscal year ending June 30, 1917, because that year contains only six months of the calendar year 1917 to which the new Federal taxes apply.

It is impossible to forecast with accuracy the taxes for the calendar year 1917, but it is by no means improbable that they will be, say \$12,000,000, or about twice the annual average of taxes for recent years, and possibly more.

The natural effect of the war with its heavy expenditures is to stimulate expenditure on the part of the states and local governing bodies much of which it is greatly feared will prove to be misdirected and unproductive. In some quarters it is already apparent that there is grave danger that the conduct of state and local affairs will become decidedly more wasteful and inefficient at the very time the need is greatest for making the best possible use of our resources of labor and materials.

Your officials are actively co-operating in efforts that are being made to promote economy and efficiency.

#### GENERAL.

Your Directors fully recognize that the time is inopportune for the construction of new lines, but the foregoing had been in all cases planned, in some cases definitely promised and in other cases placed under construction before either the great advance in prices or the declaration of war, and it seemed advisable to proceed in spite of adverse conditions. Completion will naturally be somewhat retarded, but it is hoped that all will be completed before the close of the calendar year 1918.

Contrary to our expectations all of the abnormal reasons cited a year ago as accounting for the Company's large revenues last year have been accentuated in the last twelve months. Not only is the European war still in active progress, but our own country is now participating in it and is spending enormous sums for supplies and for transportation. The Pacific Coast is still without shipping via the Panama Canal. The metal market has been unprecedentedly active in all its branches, and this has largely increased our traffic, especially in copper, zinc and lead and the raw materials entering into their production. The oil tonnage on our lines still increases. Even our passenger traffic, which we believed had reached its maximum with the two great expositions on the Pacific Coast, has again shown an increase of over a million dollars.

Owing to high prices and lack of labor, it has not been possible to add materially to equipment, and the result has been that in the effort to handle this enormous business every nerve has been strained to the utmost, and, even with all that could be done, the results have not always been what our patrons have been taught to expect. Very much against the will of your Directors and officers it has been found absolutely necessary to place orders for nearly four thousand cars of various types and for thirty engines, all of which were to have been delivered during the calendar year and some of them during the fiscal year, but the needs and demands of the Government have taken precedence, and we are still struggling along as best we may. The prices we have contracted to pay for this equipment, when received, are almost double those of two years ago.

On all sides the Company has been confronted with the necessity for increasing wages and salaries. The payroll for the last six months of the year was nearly 33 per cent. in excess of the payroll for the corresponding period two years before. This was partly due to the employment of increased forces, but after making allowance for the increase in forces it is believed that current wages and salaries are on an average about 20 per cent. over the wages and salaries in effect two years ago.

In common with all other carriers in the country, your company sought for relief in increasing its rates, but was denied, the denial being based on our large earnings. It was unfortunate that when the case was decided the large earnings were plainly visible while the greatly enhanced expense had not yet come clearly into view; and this same condition prevailed up to the end of the fiscal year for which this report is made. But the expenses are now beginning to tell on all the carriers, and somewhat later conditions may call for the renewal of our application.

Relations with the public, our patrons, continue good. In common with all other carriers, we have given assurances to the Government that its business of all kinds is to be given preferential movement, but we hope to be able to carry out the promise without serious inconvenience to those who desire to travel or to ship their customary freight. It may be, however, that we shall have to ask for a little patience on the part of these latter.

The faithful and efficient services of the officers and employees of the company are again acknowledged with pleasure by your Directors.

EDWARD P. RIPLEY,  
President.  
WALKER D. HINES,  
Chairman.



## Railway Officers

### Executive, Financial, Legal and Accounting

George F. Hawks, general manager of the El Paso & Southwestern at El Paso, Tex., has been elected vice-president and general manager in charge of operation, effective October 24.

C. E. Denney, special engineer to the president of the New York, Chicago & St. Louis, at Cleveland, Ohio, has been appointed assistant to president with headquarters at Cleveland, effective November 1.

W. L. Park, vice-president of the Illinois Central at Chicago, has been granted leave of absence for the duration of the war and has been appointed first vice-president of the Chicago Great Western, with headquarters at Chicago.

C. L. Mayne has been elected president of the Arkansas Central, with headquarters at Fort Smith, Ark., succeeding J. W. Daniels, resigned to become superintendent of the Missouri Pacific at Little Rock, Ark. F. H. Fennessy has been appointed claim agent.

M. J. Caples, vice-president of the Hocking Valley at Columbus, Ohio, has been appointed resident vice-president, representing the Chesapeake & Ohio, the Chesapeake & Ohio of Indiana, and the Chesapeake & Ohio Northern, in an executive capacity, with office at Columbus.

A. Mackrille, general auditor of the New York, New Haven & Hartford and the Central New England at New Haven, Conn., has been appointed auditor of revenue, and T. M. Prentice, auditor, has been appointed general accountant, with headquarters at New Haven. The offices of general auditor, auditor of miscellaneous receipts and auditor have been discontinued.

Benjamin Lamar Bugg, whose election as vice-president and general manager of the Atlanta, Birmingham & Atlantic, with headquarters at Atlanta, Ga., has already been announced in these columns, was born on August 8, 1869, at Palo Alto, Miss., and was educated in the high schools. He began railway work in 1887 with the Florida, Central & Peninsular, now a part of the Seaboard Air Line. In 1891 he went to the Georgia Southern & Florida and in 1895 left that road to become terminal agent of the Central of Georgia at Savannah, Ga. He was appointed general agent of the Old Dominion Steamship Company at Norfolk, Va., in 1907; in 1910 he was appointed traffic manager of the Norfolk Southern at Norfolk, and in 1912 he was appointed traffic manager of the Atlanta, Birmingham & Atlantic, later becoming assistant general manager. In March, 1916, he was promoted general manager, and now becomes vice-president and general manager of the same road, as above noted.

### Operating

E. E. Hanna, trainmaster of the Missouri, Kansas & Texas, at Oklahoma City, Okla., has been promoted to superintendent with the same headquarters, succeeding S. H. Charles, resigned to enter other business.

George F. Warner, assistant trainmaster of the Delaware & Hudson at Oneonta, N. Y., has been appointed trainmaster of the Pennsylvania division, with office at Carbondale, Pa., vice H. F. Booth, resigned; and John H. Kilker has been appointed chief train dispatcher of the Pennsylvania division, vice R. A. Siegel assigned to other duties.

George W. Neilson, chief clerk in the office of the general superintendent of the Spokane, Portland & Seattle, at Portland, Ore., has been appointed superintendent of the Pacific & Eastern, with headquarters at Medford, Ore., succeeding G. E. Johnson, who has been appointed superintendent of the Gales Creek & Wilson River at Wilkesboro, Ore.

F. F. Riefel, superintendent of the Detroit division of the New York Central lines at Detroit, Mich., has been appointed superintendent of the Michigan division, with office at Toledo, vice E. Thwaites, transferred as superintendent to the Toledo division,

with office at Cleveland, vice E. R. Bissell, who has been appointed superintendent of the Detroit division, vice Mr. Riefel.

John A. Carson has been appointed superintendent of steamers of the Southern Pacific Company, Pacific system, with headquarters at San Francisco, Cal., with jurisdiction over all floating equipment, vice William Chisholm, resigned, and J. J. Jordan, trainmaster at Roseville, Cal., has been appointed assistant superintendent of the Coast division, in charge of San Francisco terminal.

C. E. Hair, whose appointment as assistant general superintendent of the Chicago, Terre Haute & Southeastern, with headquarters at Terre Haute, Ind., was announced in the *Railway Age Gazette* of October



C. E. Hair

19, began railway work on January 2, 1906, as a clerk in the freight department of the Chicago, Burlington & Quincy at Chicago. He held various positions until August, 1909, when he was made secretary to the freight traffic manager, leaving the Burlington in May, 1913, to enter the service of the Chicago, Terre Haute & Southeastern as secretary to the president. Mr. Hair retained the latter position until his appointment on August 20, as assistant general superintendent, with headquarters at Terre Haute.

A. E. Knights, trainmaster of the Great Northern at Havre, Mont., has been promoted to superintendent of the Montana division, with the same headquarters, succeeding C. E. Leverich, resigned, effective October 25.

William F. Giles, whose appointment as superintendent of the Chicago, Burlington & Quincy, at Brookfield, Mo., was announced in the *Railway Age Gazette* of October 5, was born at Aurora, Ill., on August 17, 1869.



W. F. Giles

He was educated at Valparaiso University, Valparaiso, Ind., and entered railway service with the Burlington on August 17, 1888, as a telegraph operator, remaining in that position until 1893. From December, 1903, to January, 1905, he was an electrician on the Burlington, and from the latter date until 1907 was supervisor of signals. He was then trainmaster until 1911, when he was promoted to assistant superintendent, remaining in that position on the Brookfield and Beardstown divisions, until October 1, 1917,

when he was appointed superintendent of the Brookfield division, succeeding W. A. Chittenden, transferred to Beardstown, Ill.

Fred Wear, whose appointment as superintendent of the Butte division of the Great Northern, with headquarters at Great Falls, Mont., was announced in the *Railway Age Gazette* of October 5, was born at London, Ont., on July 22, 1868. He began railway work in 1885 as clerk for the Grand Trunk at Windsor, Ont., and from 1886 to October, 1888, was a brakeman on that road. He was subsequently conductor and yardmaster for the Toledo, St. Louis & Kansas City until June, 1906, and from the latter date to April, 1908, was with the St. Louis

& San Francisco as conductor and yardmaster. He then became general yardmaster for the Ann Arbor at Cadillac, Mich. In December, 1909, he went to the Great Northern as general yardmaster at Great Falls. He was promoted to trainmaster in 1911 and served in that capacity on the Butte, Kalispell, Mesabi and Fergus Falls divisions until his recent appointment as division superintendent, as above noted.

F. H. Hammill, whose appointment as general superintendent of the northern district of the Union Pacific, with headquarters at Omaha, Neb., was announced in the *Railway Age Gazette* of October 26, was born at Rockford, Ill., on January 23, 1872. He entered railway service with the Chicago & North Western in September, 1887, and from 1888 to 1902, was employed by the Chicago, Milwaukee & St. Paul successively as telegraph operator and train despatcher. He then returned to the Chicago & North Western as train-despatcher, and was consecutively trainmaster, assistant superintendent, superintendent, and assistant general superintendent in charge of Iowa lines, with headquarters at Boone, Iowa, until October 20, when he was appointed general superintendent of the northern district of the Union Pacific.



F. H. Hammill

R. W. Mitchener, superintendent of transportation of the New York, Chicago & St. Louis, at Cleveland, Ohio, has been appointed general superintendent with headquarters at Cleveland, and the office of superintendent of transportation has been abolished. A. A. Pearce has been appointed superintendent of freight transportation with headquarters at Cleveland, a newly created position.

J. W. Daniels, whose appointment as superintendent of the Arkansas division of the Missouri Pacific, with headquarters at Little Rock, Ark., was announced in the *Railway Age Gazette* of October 19, began railway work at the age of 13 with the St. Louis & San Francisco. When 14 years of age he was night operator and at 18 years was train despatcher. He became connected with the Missouri Pacific in 1894 as train despatcher and served successively as chief despatcher, trainmaster and superintendent of various divisions. In October, 1916, he was elected president of the Arkansas Central, with headquarters at Ft. Smith, Ark., which position he held until his recent appointment as division superintendent of the Missouri Pacific, with office at Little Rock, as noted above.



J. W. Daniels

J. T. Gillick, assistant general manager of the Chicago, Milwaukee & St. Paul, at Chicago, has been promoted to general manager of the lines east of Mobridge, S. D., succeeding P. C. Hart assigned to other duties. Macy Nicholson, assistant to vice-president in charge of operation of the Great Northern, at St. Paul, Minn., has been appointed assistant general manager of the Chicago, Milwaukee & St. Paul, succeeding Mr. Gillick.

Effective November 1. A portrait of Mr. Gillick and a sketch of his railway career were published in the *Railway Age Gazette* of July 13, 1917, page 89.

W. H. Foster, whose appointment as general superintendent lines west, of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has already been announced in these columns was born on June 8, 1866. He began railway work in 1882, as an operator on the Pennsylvania Railroad and in 1888, entered the service of the New York, New Haven & Hartford as an operator and despatcher. In 1903 he was appointed chief despatcher and five years later became trainmaster. He was appointed division superintendent in 1912, and since May, 1917, was superintendent of the New Haven division at New Haven, Conn., until his recent appointment as general superintendent of the lines west of the same road, as above noted.

W. R. Hudson, general superintendent of the Chesapeake & Ohio at Covington, Ky., has been assigned to other duties, and the Cincinnati & Ashland divisions and the Chesapeake & Ohio Northern have been placed under the jurisdiction of L. B. Allen, general superintendent at Huntington, W. Va. The lines west of Hinton, W. Va. (Chesapeake & Ohio of Indiana excepted), will hereafter be known as the Western general division. The Chesapeake & Ohio of Indiana will be operated separately and the superintendent will report direct to the general manager. The Big Sandy division has been assigned to J. B. Harris, superintendent of the Ashland division and he has been relieved of the Cincinnati division and the Chesapeake & Ohio Northern. The jurisdiction of W. S. Taylor, superintendent Cincinnati Terminal division, has been extended over the Cincinnati division and the C. & O. N., with office at Covington, Ky. J. H. Carlisle, assistant superintendent of freight transportation at Richmond, Va., has been appointed fuel agent with headquarters at Huntington, W. Va. A. T. Lowmaster, superintendent of terminals at Chicago, has been appointed assistant superintendent freight transportation at Richmond, Va. W. D. Cummins has been appointed trainmaster, Cincinnati Terminal division at Covington, Ky. H. R. Davis has been appointed assistant trainmaster of the Cincinnati division and C. & O. N. at Russell, Ky. J. A. Barker, trainmaster at Peru, Ind., has been appointed superintendent of terminals of the Chesapeake & Ohio of Indiana at Chicago. W. M. Lynch, assistant trainmaster at Boston, Ind., has been appointed trainmaster with headquarters at Peru, and F. L. Poindexter has been appointed assistant trainmaster with headquarters at Boston. Effective October 28.

#### Traffic

F. J. Parker, division freight agent of the Michigan Central at Detroit, Mich., has been appointed assistant general freight agent, with office at Detroit.

W. H. Andrews, westbound contracting freight agent of the Toledo, St. Louis & Western at St. Louis, Mo., has been promoted to general agent at Los Angeles, Cal., to succeed F. M. Miller, resigned to enter military service.

G. N. Snider, coal traffic manager of the New York Central, at New York, has been appointed fuel transportation manager with the United States Fuel Administration, Washington, D. C.

A. S. Learoyd, general freight agent of the Delaware, Lackawanna & Western, at New York, has been granted leave of absence, and has been appointed on the staff of the Fuel Administration at Washington, D. C., to take charge of the distribution of anthracite coal.

A. E. Yardley, commercial agent of the Tennessee Central at Chicago, has been appointed commercial agent, with office at St. Louis, Mo., vice L. L. Beck, resigned, to engage in other business. Mr. Yardley will also continue as commercial agent at Chicago.

J. F. Reily, commercial agent of the Missouri, Kansas & Texas, at Sedalia, Mo., has been appointed general freight and ticket agent in Kansas, with headquarters at Parsons, Kan., succeeding L. B. Chipley, appointed industrial and colonization agent at Boston, Mass. O. C. Thomas has been appointed commercial agent at Tulsa, Okla., to succeed F. W. Dunn, transferred to Oklahoma City, Okla., in place of Mr. Thomas. C. R. Gordon has been appointed commercial agent at Sedalia, Mo., succeeding Mr. Reily.



S. L. Jones, assistant New England agent of the Central of Georgia at Boston, Mass., has been appointed New England agent at Boston, vice A. DeW. Sampson, retired under the company's pension system. Effective November 1.

The following have been appointed industrial and colonization agents of the Missouri, Kansas & Texas, effective October 1: L. B. Chipley, at Boston, Mass., formerly general freight and ticket agent at Parsons, Kan.; Chas. E. Osborne, at Pittsburgh, Pa., formerly chief rate clerk in the general freight office at Dallas, Tex.; L. E. O'Leary, at Cleveland, Ohio, and A. Bryant, at Chicago, both previously connected with the industrial department at St. Louis, Mo.; Chas. L. Knox, at Omaha, Neb., formerly traveling freight claim agent in Texas.

Albert P. Chapman, Jr., whose appointment as assistant general passenger agent of the Chicago, Milwaukee & St. Paul was announced in our issue of August 3, was born at Hartford, Wis., on January 7, 1865. He first entered railway service as a ticket clerk and operator on the St. Paul at Watertown, Wis. He remained at Watertown until 1887, when he was made assistant ticket agent at Milwaukee, Wis. In 1900, he was appointed city ticket agent at Chicago and in 1911, went to Seattle, Wash., to become general agent of the passenger department, which position he continued to hold until his promotion to assistant general passenger agent with the same headquarters on August 1, 1917.

M. A. Patterson, whose appointment as general freight agent of the Chicago, Rock Island & Pacific was announced in the *Railway Age Gazette* of September 28, first entered railroad service in January, 1879, as a clerk in the local freight office of the Illinois Midland at Peoria, Ill. In October, 1881, he went to the Chicago, Rock Island & Peoria as a clerk in the local freight office at Peoria and subsequently was made chief clerk. From November, 1884, to June, 1898, he was chief clerk to the general freight and passenger agent of the Rock Island & Peoria, an independently operated part of the Rock Island system, at Rock Island, Ill., and the following four years was general freight and passenger agent. On July



M. A. Patterson

1, 1902, when the R. I. & P. was consolidated with the other Rock Island lines, he was appointed assistant general freight agent at Rock Island, later being transferred to Davenport, Ia., with jurisdiction extended over the Peoria, Iowa and Missouri divisions. On July 1, 1903, he was made assistant general freight agent at Kansas City, Mo., with jurisdiction over lines west of the Missouri river, and in November of the following year was transferred to Chicago with the same title and with jurisdiction over the lines east of the Missouri river, in special charge of coal, lumber and livestock traffic, the duties of the position being subsequently enlarged to cover freight traffic in general in the same territory. On September 13 last Mr. Patterson was promoted to general freight agent of the lines east, as noted above.

Frederick E. Hollingshead, whose appointment as assistant general freight agent of the Chicago, Burlington & Quincy, with headquarters at St. Joseph, Mo., was announced in the *Railway Age Gazette* of October 12, was born at Trumansburg, N. Y. He began railway work on October 5, 1887, in the local freight office of the Burlington at Kansas City, Mo., where he was employed as clerk in various capacities until August, 1894, when he was made chief clerk. In November, 1896, he was appointed chief clerk in the general southwestern agent's office, and in August, 1899, was appointed soliciting freight agent, with headquarters in the same office. In December, 1902, he became chief clerk to the general freight agent at St. Louis, Mo., and in September, 1905, was transferred to Hannibal, Mo., as general

agent, which position he held until October 12, of this year, when he was promoted to assistant general freight agent.

Frederick Montmorency, whose appointment as general freight agent of the Chicago, Burlington & Quincy, with headquarters at Omaha, Neb., was announced in the *Railway Age Gazette* of



F. Montmorency

October 12, was born on September 26, 1870. He entered the service of the Burlington on July 1, 1888, as a clerk in the freight claim department at Omaha, and on December 1, 1898, he was made chief clerk to the superintendent of the McCook division, at McCook, Neb. He was appointed assistant general freight agent of the lines west of the Missouri river on September 1, 1900, which position he held until October 5, 1917, when he was promoted to general freight agent of the lines west of the Missouri river, as above noted.

E. B. Wilkerson has been appointed general agent in the freight department of the Missouri Pacific, with headquarters at Wichita, Kan., succeeding S. H. Kilgore, transferred, effective November 1.

Thomas Denton Geoghegan, whose appointment as traffic manager of the Gulf, Mobile & Northern, with headquarters at Mobile, Ala., has already been announced in these columns, was



T. D. Geoghegan

born on April 8, 1888, at Louisville, Ky., and was educated in the Louisville Normal Training High School. In December, 1903, he began railway work with the Southern Railway as a file clerk in the office of the assistant freight traffic manager at Louisville, Ky., and was in the continuous service of that road until his recent appointment as traffic manager of the G., M. & N. He served as tariff clerk at Louisville, then as correspondence clerk until November, 1906, when he became assistant tariff clerk in the general freight office at Atlanta,

Ga. He was then consecutively assistant quotation clerk at Atlanta; quotation clerk, and later assistant chief clerk at Washington, D. C. In May, 1909, he was appointed chief clerk at Columbia, S. C., then was rate clerk at Atlanta, and later assistant chief clerk at the same place. In June, 1911, he was appointed chief rate clerk and subsequently became chief clerk in the office of the freight traffic manager at Washington, D. C. In February, 1917, he was appointed chief clerk in the office of the vice-president at the same place, which position he held at the time of his appointment as traffic manager of the Gulf, Mobile & Northern, as above noted.

#### Engineering and Rolling Stock

A. A. Cross, has been appointed assistant engineer of the New York, New Haven & Hartford, with office at New Haven, Conn., to succeed E. O. Carlson, who has entered military service.

H. J. Graeser, office engineer of the St. Louis Southwestern of Texas, at Tyler, Tex., has been promoted to division engineer, with headquarters at Mount Pleasant, Tex., succeeding T. J. Williams, Jr., resigned, effective October 3.

G. W. Corrigan, division engineer of the Stockton division of the Southern Pacific at Stockton, Cal., has been appointed division engineer of the San Joaquin division, vice J. P. Edwards, resigned, and J. B. Dawson has been appointed division engineer of the Stockton division, vice Mr. Corrigan.

L. S. Kinnaird, whose appointment as superintendent of motive power of the Chicago & Eastern Illinois, with headquarters at Danville, Ill., was announced in the *Railway Age Gazette* of October 5, was born on July 23, 1869, at Ft. Wayne, Ind., and graduated in mechanical engineering from Purdue University in 1896. He began railway work in 1890 as a draftsman for the Pennsylvania Company, serving in that capacity until September, 1892, when he entered Purdue. He worked as a special apprentice in the shops of the Pennsylvania Company during the summers of 1893, 1894 and 1895, and on July 5, 1896, took permanent employment with that company as a special apprentice. On January 1, 1900, he was appointed assistant master mechanic at Allegheny, Pa., and on November 20, 1902, he was appointed master mechanic of the Cleveland, Akron & Columbus at Mt. Vernon, Ohio. Mr. Kinnaird was appointed master mechanic of the Pittsburgh, Cincinnati, Chicago & St. Louis, at Logansport, Ind., on June 1, 1915, which position he resigned on September 30 to become superintendent of motive power of the Chicago & Eastern Illinois.

Charles Lee McIlvaine, who has been appointed superintendent of motive power of the Northern division of the Pennsylvania Railroad, with headquarters at Buffalo, N. Y., as has already been announced in these columns was born on September 25, 1872, at Wilmington, Del., and graduated from the mechanical engineering department of the University of Pennsylvania. On October 1, 1899, Mr. McIlvaine entered the service of the Philadelphia, Baltimore & Washington, as a machinist apprentice in the Wilmington shops, and was promoted to the Altoona (Pa.) shops of the Pennsylvania Railroad in January, 1901. He was appointed draftsman in the office of the superintendent of motive power at Jersey City, N. J., in January, 1903, and two years later, was promoted to motive power inspector. In May, 1905, he became assistant master mechanic at the Pavonia shops, Camden, N. J., and two years later, he was appointed assistant engineer of motive power of the Buffalo & Allegheny Valley division, at Buffalo, N. Y. On September 1, 1910, he was transferred to the Erie division and Northern Central Railway at Williamsport, Pa., in the same capacity, and in May, 1911, assumed these duties under the general superintendent of motive power, at Altoona, Pa. He was promoted to master mechanic of the New York, Philadelphia & Norfolk on July 1, 1913, returning to the Pennsylvania Railroad in May, 1917, as master mechanic of the Philadelphia division and on October 10, was appointed superintendent of motive power of the Northern division, as above noted.



L. S. Kinnaird



C. L. McIlvaine

### Purchasing

J. F. Esch has been appointed purchasing agent of the Colorado Midland, with headquarters at Colorado Springs, Colo., in place of C. N. Davids, resigned.

John E. Byron, whose appointment as general storekeeper of the Boston & Maine with headquarters at Boston, Mass., has already been announced in these columns, was born on December 4, 1874, at Concord, N. H., and received his education in grammar, high school and business college. He began railway work on April 25, 1892, as clerk and stenographer to the general manager of the Concord & Montreal, and on July 22, 1895, became superintendent's clerk on the Southern division of its successor the Boston & Maine. In November, 1911, he was appointed chief clerk in the maintenance of way department and in August, 1917, was appointed general storekeeper of the same road, as above noted.

H. A. Anderson who has been appointed assistant purchasing agent of the Pennsylvania Railroad, with headquarters at Philadelphia, Pa., as has already been announced in these columns entered the service of the Pennsylvania Railroad in July, 1883 as a messenger in the transportation department at Altoona, Pa. Three years later he was transferred to the motive power department where he served as clerk in the Juniata shops, and later as chief clerk to the general superintendent of motive power. In February, 1904, he was promoted to stock clerk in the purchasing department, and in December of the following year was made special agent of the purchasing department which position he held at the time of his recent appointment as assistant purchasing agent of the same road as above noted.

### Railway Officers in Military Service

F. M. Miller, general agent, freight department, of the Toledo, St. Louis & Western at Los Angeles, Cal., has resigned to enter military service at American Lake, Wash.

S. A. Tubman, commercial agent of the Central of Georgia at Baltimore, Md., has been commissioned captain in the Quartermaster's Department of the United States Army.

E. O. Carlson, assistant engineer of the New York, New Haven & Hartford, at New Haven, Conn., has entered military service and is now with the Eleventh Regiment of Railway Engineers.

F. M. Smith, trainmaster of the Northern Pacific at East Grand Forks, Minn., who was granted a leave of absence on September 28, to enter military service, has been commissioned captain, Engineers' Corps, Second Company, Fort Leavenworth, Kan.

Woolsey Finnel, valuation engineer of the Mobile & Ohio, has been commissioned major, and H. Austill, bridge engineer, has been commissioned captain, in the Five Hundred and First Battalion, Twentieth Engineers; L. M. Pill, valuation engineer, has been commissioned captain in the Engineers' Reserve Corps.

### OBITUARY

H. P. Elliott, freight claim agent of the Chicago, Milwaukee & St. Paul, at Chicago, died in that city on October 28.

Harry L. Moffett, trainmaster of the Illinois Central at Clinton, Ill., who was recently granted a leave of absence on account of ill health, died in that city on October 21.

Stephen Little, formerly and for many years secretary and controller of the Denver & Rio Grande, died on October 29 at his home in New York City at the age of 87. Mr. Little was born in Ireland and came to this country when a boy. In 1850 he began railroad work on the Pennsylvania Railroad. In 1859 he was appointed auditor of the Northern Central and remained with that company until 1874, when he went to New York City as controller of the Erie, then in reorganization. In 1886 he became controller of the Pullman Company. In 1891 he became controller and later also secretary of the Denver & Rio Grande. He resigned two years ago and retired. Mr. Little was a man of unusual attainments. As an expert in railroad accounting he was broad minded and thoroughly informed. Aside from his routine duties he undertook a number of important special commissions, including investigations of bankrupt roads, and his reports in such cases were noted for their lucidity and fairness and for the independent and impartial spirit manifested. His business standards were always the highest.